

Curriculum Vitae

Steven P. Levitan

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PROFESSIONAL INTERESTS

I am interested in the design, modeling, simulation, and verification of highly parallel systems, including sensing, computing and communications functions. In particular, I have been focused on parallel and optical computer architectures, VLSI systems and mixed-technology microsystems. My recent work is on computer architecture and computer aided design tools and methodologies for mixed-signal multi-domain systems spanning software, digital and analog electronics and optical MEMS.

EDUCATION

- Ph.D.** May 1984, University of Massachusetts, Department of Computer and Information Science (COINS). Dissertation title: "Parallel Architectures and Algorithms: A Programmer's Perspective," Advisor: Caxton C. Foster.
- M.A.** November 2007, (Degree by Resolution) Balliol College, University of Oxford, United Kingdom.
- M.S.** September 1979, University of Massachusetts, Department of Computer and Information Science (COINS). Specialization: Computer Systems.
- B.S.** June 1972, Case Western Reserve University, School of Engineering. Major: Computer Science, Minor: Electrical Engineering.

PROFESSIONAL POSITIONS HELD

- John A. Jurenko Professor**, September 1999 - Department of Electrical Engineering, University of Pittsburgh. Secondary appointments in the Department of Computer Science and the Computer Engineering Program.
- Visiting Scholar** (Sabbatical) 5/14-4/15: Institute for Neural Computation, University of California, San Diego.
- Visiting Fellow** (Sabbatical) 9/07-8/08: Balliol College, and Academic Visitor, Engineering Science, University of Oxford, United Kingdom.
- Visiting Researcher**, (Sabbatical) 9/00-7/01: Techniques of Informatics and Microelectronics for computer Architecture (TIMA) Laboratory, Grenoble, France.
- Wellington C. Carl Associate Professor**, 1992-1999: Department of Electrical Engineering, University of Pittsburgh.
- Visiting Scholar**, (Sabbatical) 7/93-12/93: University of California, San Diego, and visitor at the University of Colorado, Boulder.

Wellington C. Carl Assistant Professor, 1987-1992: Department of Electrical Engineering, University of Pittsburgh.

Assistant Professor, 1985-1986 (tenure stream began September 1985): Department of Electrical and Computer Engineering, University of Massachusetts, Amherst. **Director, VLSI Laboratory** (1985-1986): Responsible for coordination and direction of VLSI design laboratory. Liaison to the Massachusetts Technology Park Corporation, Massachusetts Microelectronics Center.

Visiting Assistant Professor, 1984-1985: Electrical and Computer Engineering, University of Massachusetts, Amherst.

Consultant, 1984-1987: Viewlogic Systems. Developed VLSI design and simulation software.

Consultant, 1982-1983: Digital Equipment. Consulted for the VLSI Advanced Architectures Group on silicon compilers, simulation, and parallel processing issues.

Engineer, Summer 1982: Digital Equipment. One of the team that developed the "Silicon Synthesis Project," a VLSI design tool.

Co-founder, 1980-1983: Humanistic Computing Systems. Consultant in the development of user-friendly software.

Teaching Assistant/Lecturer, 1978-1982: Department of Computer and Information Science (COINS), University of Massachusetts, Amherst.

Senior Systems Engineer, 1972-1977: Xylogic Systems. Designed serial, parallel and DMA interfaces for minicomputer based text-processing systems used in newspaper production. I trained and supervised in house test and field service personnel. Largest project was a multi-computer, dual-chain disk controller.

Test Technician, 1972: ARP. Tested and repaired music synthesizers, and trained repair personnel.

ACADEMIC & SERVICE AWARDS

IEEE Fellow for Contributions to Mixed-Technology Micro-Systems Education - January 1, 2015.

University of Pittsburgh Chancellor's Distinguished Teaching Award - 2014.

Swanson School of Engineering Outstanding Educator Award - 2013.

IEEE/ACM Design Automation Conference Leadership Award - General Chair for DAC, 2007, June 5, 2013.

Provost's Academic Council on Instructional Excellence (ACIE) Award - May, 2010.

Oliver Smithies Lectureship - Balliol College, University of Oxford, United Kingdom, 2007-2008.

ACM Recognition of Service Award – in appreciation for Contributions to ACM as Chair for Nanoarch '08: IEEE International Symposium on Design and Test of Nanoscale Architectures, June 12-13, 2008.

ACM Recognition of Service Award – in appreciation for Contributions to ACM as General Chair for DAC, 2007.

ACM/SIGDA Distinguished Service Award – recognized for contributions to the SIGDA Ph.D. Forum at DAC, 2007.

ACM/SIGDA Service Award – in appreciation for Contributions to ACM/SIGDA, 2005.

ACM/SIGDA Distinguished Service Award – recognized for over a decade of service to ACM/SIGDA and the EDA Industry, 2002.

John A. Jurenko Professorship in Computer Engineering, 1999-.

Best Paper - 34th IEEE/ACM Design Automation Conference, Design Methodology, 1997.

Best Paper - IEEE International Conference on Neural Networks, 1996.

ACM/SIGDA Leadership Award - recognized for outstanding leadership in support of the ACM Special Interest Group for Design Automation, 1996.

Board of Visitors Faculty Award - acknowledged for productivity in program development, research, and teaching in the School of Engineering, 1994.

Wellington C. Carl Faculty Fellowship - selected as an outstanding faculty member in the School of Engineering, 1987-1999.

IEEE Computer Society Distinguished Visitor - 1989-1994.

Regents' Doctoral Fellowship - selected by the Regents of the University of Massachusetts as an outstanding graduate student in Electrical Engineering or Computer Science, 1984.

PATENTS

Separation of Particles Using Multiplexed Dielectrophoresis, (with D. Chiarulli, S. Dickerson), Provisional filed December 2011, University Ref. No. 02611, USSN 61/576,155; Application filed December 2012, USSN 13/713,802.

Manipulation, Detection, and Assay of Small Scale Biological Particles, (with D. Chiarulli, S. Dickerson), October 2, 2012, Number 8,278,188.

Power Efficient, High Bandwidth Communication Using Multi-Signal Differential Channels, (with D. Chiarulli), April 15, 2008, Number 7,358,869.

Optoelectronic Multi-Chip Modules using Imaging Fiber Bundles, (with D. Chiarulli, K. Tatak, and M. Robinson), October 14, 2003, Number 6,633,710.

An Optical Selector Switch, (with R. Melhem, D. Chiarulli), September 1988, Number 4,883,334.

INVENTION DISCLOSURES

Parser for Spectre File Format, (with D. Chiarulli, M. Kahrs), Filed April 2007.

PUBLICATIONS

Refereed Journal Publications:

1. Victor V. Yashin, Steven P. Levitan, Anna C. Balazs, "Achieving Synchronization with Active Hybrid Materials: Coupling Self-oscillating Gels and Piezoelectric Films," *Scientific Reports*, 5, 11577 2015. DOI: 10.1038/srep11577
2. Victor V. Yashin, Steven P. Levitan, and Anna C. Balazs, "Modeling the entrainment of self-oscillating gels to periodic mechanical deformation," *Chaos: An Interdisciplinary Journal of Nonlinear Science* 25, 064302, 2015. DOI:10.1063/1.4921689
3. P. Wang, X. Wang, Y. Zhang, H. Li, S.P. Levitan, Y. Chen, "Nonpersistent Errors Optimization in Spin-MOS Logic and Storage Circuitry," *IEEE Transactions on Magnetics*, Vol. 47, No. 10, pp. 3860-3863, October 2011. DOI: 10.1109/TMAG.2011.2153838
4. G.V. Kolmakov, V.V. Yashin, S.P. Levitan, A.C. Balazs, "Designing Self-propelled Microcapsules for Pick-up and Delivery of Microscopic Cargo," *Soft Matter*, Vol. 7, pp. 3168-3176, 2011.
5. German V. Kolmakov, Victor V. Yashin, Steven P. Levitan, Anna C. Balazs, "Designing Communicating Colonies of Biomimetic Microcapsules," *Proceedings of the National Academy of Sciences*, Vol. 107, No. 28, pp. 12417-12422, July 13, 2010.
6. Jason D. Bakos, Donald M. Chiarulli, Steven P. Levitan, "Lightweight Error Correction Coding for System-Level Interconnects," *IEEE Transactions on Computers*, Vol. 56, No. 3, pp. 289-304, March 2007. DOI: 10.1109/TC.2007.49
7. Charles Jewart, Kevin P. Chen, Ben McMillen, Michael M. Bails, Steven P. Levitan, "Sensitivity enhancement of fiber Bragg gratings to transverse stress using micro-structural fibers," *Optics Letters*, Vol. 31, No. 15, pp. 2260-2262, August 2006.
8. M.M. Bails, J.A. Martinez, S.P. Levitan, J.M. Boles, I. Avdeev, M. Lovell, D.M. Chiarulli, "Performance Simulation of a Microwave Micro-Electromechanical System Shunt Switch Using Chatoyant," *Analog Integrated Circuits and Signal Processing*, Vol. 44, No. 2, pp. 137-154, August 2005.
9. N. Wattanapongsakorn, S.P. Levitan, "Reliability Optimization Models for Embedded Systems with Multiple Applications," *IEEE Transactions on Reliability*, Vol. 53, No. 3, pp. 406-416, September 2004.
10. M. Kahrs, S.P. Levitan, D.M. Chiarulli, T.P. Kurzweg, J.A. Martínez, J. Boles, A.J. Davare, E. Jackson, C. Windish, F. Kiamilev, A. Bhaduri, M. Taufik, X. Wang, A. Morris, J. Kruchowski, B.K. Gilbert, "System-level Modeling and Simulation of the 10G Optoelectronic Interconnect," *Journal of Lightwave Technology*, Vol. 21, No. 12, pp. 3244-3256, December 2003.
11. S.P. Levitan, J.A. Martinez, T.P. Kurzweg, A.J. Davare, M. Kahrs, M. Bails, D.M. Chiarulli, "System Simulation of Mixed-signal Multi-domain Microsystems with Piecewise Linear Models," *IEEE Transactions on Computer Aided Design*, Vol. 22, No. 2, pp. 139-154, February 2003.
12. J.A. Martinez, T.P. Kurzweg, S.P. Levitan, P.J. Marchand, D.M. Chiarulli, "Mixed-Technology System-Level Simulation," *Analog Integrated Circuits and Signal Processing*, Vol. 29, No. 1-2, pp. 127-149, October 2001.

13. T.P. Kurzweg, J.A. Martinez, S.P. Levitan, M.T. Shomsky, P.J. Marchand, D.M. Chiarulli, "Modeling Optical MEM Systems," *Journal of Modeling and Simulation of Micro- Systems*, Vol. 2, No. 1, pp. 21-34, 2001.
14. D.M. Chiarulli, S.P. Levitan, P. Derr, R. Hofmann, B. Greiner, M. Robinson, "Demonstration of Multi-channel Optical Interconnection using Imaging Fiber Bundles Butt Coupled to Optoelectronic Circuits," *Applied Optics*, Vol. 39, No. 5, pp. 698-703, 10 February 2000.
15. J.F. Plusquellic, D.M. Chiarulli, S.P. Levitan, "Time- and Frequency-Domain Transient Signal Analysis for Defect Detection in CMOS Digital IC's," *IEEE Transactions on Circuits and Systems-I: Fundamental Theory and Applications*, Vol. 46, No. 11, pp. 1390-1394, November 1999.
16. K. Choi, S.P. Levitan, "A Flexible Datapath Allocation Method for Architectural Synthesis," *ACM Transactions on Design Automation of Electronic Systems*, Vol. 4, No. 4, pp. 376-404, October 1999.
17. Y.-W. Hsieh, S.P. Levitan, "Control/Data-Flow Analysis for VHDL Semantic Extraction," *Journal of Information Science and Engineering*, Vol. 14, No. 3, pp. 547-565, 1998.
18. S.P. Levitan, P.J. Marchand, "Computer-Aided Design for Optoelectronic Systems: Introduction to the Feature Issue," *Applied Optics*, Vol. 37, No. 26, pp. 6057-6058, 10 Sept 1998.
19. S.P. Levitan, T.P. Kurzweg, P.J. Marchand, M.A. Rempel, D.M. Chiarulli, J.A. Martinez, J.M. Bridgen, C. Fan, F.B. McCormick, "Chatoyant, a Computer-Aided Design Tool for Free-Space Optoelectronic Systems," *Applied Optics*, Vol. 37, No. 26, pp. 6078-6093, 10 Sept. 1998.
20. S.T. Frezza, S.P. Levitan, P.K. Chrysanthis, "Linking Requirements and Design Data for Automated Functional Evaluation," *Computers in Industry Special Issue on Electronic Design Process*, Vol. 30, No. 1, pp. 13-25, (Elsevier) Sept. 1996.
21. G.A. Aksenov, V.S. Banzarov, T.B. Bolshakov, A.G. Chertovskikh, S. Levitan, I.B. Logashenko, A.V. Maksimov, Y.I. Merzlyakov, V.A. Monich, V.V. Shilo, E.P. Solodov, I.V. Sorokin, J.A. Thompson, C.M. Valine, V.G. Zavarzin, "Transputer Based Data Acquisition System for the CMD-2 Detector," *Nuclear Instruments & Methods in Physics Research, Section A (Accelerators, Spectrometers, Detectors and Associated Equipment)*, Vol. 379, No. 3, pp. 550-551, Sept. 21, 1996.
22. D.M. Chiarulli, S.P. Levitan, R.G. Melhem, J.P. Teza, G. Gravenstreter, "Partitioned Optical Passive Star (POPS) Multiprocessor Interconnection Networks with Distributed Control," *Journal on Lightwave Technology*, Vol. 14, No. 7, pp. 1601-1612, July 1996.
23. D.M. Chiarulli, S.P. Levitan, "An Optoelectronic Cache Memory System Architecture," *Applied Optics*, Vol. 35, No. 14, pp. 2449-2456, 10 May 1996.
24. D.W. Bouldin, P. Banerjee, M.A. Bayoumi, G. Borriello, F. Catthoor, B. Courtois, S.R. Das, H.L. Davidson, G. DeMicheli, D. Hill, M. Ismail, W.H. Joyner, N. Kanopoulos, S.P. Levitan, J.F. McDonald, A. Mukherjee, Y. Nakamura, V.G. Oklobzija, L.M. Patnaik, N. Ranganathan, B.J. Sheu, C.E. Stroud, D.E. Thomas, C.K. Wong, C.Y. Wu, T. Yanagawa, "Foreword for March 1996 issue," *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, Vol. 4, No. 1, 1-12 Mar. 1996.
25. J.F. Plusquellic, D.M. Chiarulli, S.P. Levitan, "Digital IC Device Testing by Transient Signal Analysis (TSA)," *IEE Electronics Letters*, Vol. 31, No. 18, pp. 1568-1570, 31 Aug. 1995.

26. D. M. Chiarulli, S. P. Levitan, R. G. Melhem, M. M. Bidnurkar, R. M. Ditmore, G. Gravenstreter, Z. Guo, C. Qiao, M. Sakr, J. Teza, "Optoelectronic Buses for High-Performance Computing," *IEEE Proceedings*, Vol. 82, No. 11, pp. 1701-1710, Nov. 1994.
27. C. Qiao, R.G. Melhem, D.M. Chiarulli, S.P. Levitan, "A Time Domain Approach for Avoiding Crosstalk in Optical Blocking Multistage Interconnection Networks," *Journal of Lightwave Technology*, Vol. 12, No. 10, pp. 1854-1862, Oct. 1994.
28. C. Qiao, R.G. Melhem, D.M. Chiarulli, S.P. Levitan, "Dynamic Reconfiguration of Optically Interconnected Networks with Time Division Multiplexing," *Journal of Parallel and Distributed Computing*, Vol. 22, No. 2, pp. 268-278, Aug. 1994.
29. D.M. Chiarulli, S.P. Levitan, R.G. Melhem, C. Qiao, "Locality Based Control Algorithms for Reconfigurable Optical Interconnection Networks," *Applied Optics*, Vol. 33, No. 8, pp. 1528-1537, 10 Mar. 1994.
30. S.T. Frezza, S.P. Levitan, "SPAR: A Schematic Place and Route System," *IEEE Transactions on Computer Aided Design of Integrated Circuits and Systems*, Vol. 12, No. 7, pp. 956-973, July 1993.
31. A.R. Martello, S.P. Levitan, "Temporal Analysis of Time Bounded Digital Systems," (in) *Correct Hardware Design and Verification Methods*, George J. Milne, Laurence Pierre Eds., Springer-Verlag Lecture Notes in Computer Science, Vol. 683, pp. 27-38, IFIP WG10.2 Advanced Research Working Conference on Correct Hardware Design and Verification Methods, CHARME'93, Arles, France, 24-26 May 1993.
32. D.M. Chiarulli, R.M. Ditmore, S.P. Levitan, R.G. Melhem, "An All Optical Addressing Circuit: Experimental Results and Scalability Analysis," *Journal of Lightwave Technology*, Vol. 9, No. 12, pp. 1717-1725, Dec. 1991.
33. Z. Guo, R.G. Melhem, R.W. Hall, D.M. Chiarulli, S.P. Levitan, "Pipelined Communications in Optically Interconnected Arrays," *Journal of Parallel and Distributed Computing*, Vol. 12, No. 3, pp. 269-282, July, 1991.
34. C. Qiao, R.G. Melhem, D.M. Chiarulli, S.P. Levitan, "Optical Multicasting in Linear Arrays," *International Journal on Optical Computing*, Vol. 2, No. 1, pp. 31-48, April, 1991.
35. D.N. Krieger, T.W. Berger, S.P. Levitan, R.J. Sciabassi, "An Interactive Toolset for Characterizing Complex Neural Systems," *Computers and Mathematics with Applications*, Vol. 20, Mathematical Models in Medicine, No. 4-6, pp. 231-246, 1990.
36. D.M. Chiarulli, S.P. Levitan, R.G. Melhem, "Optical Bus Control for Distributed Multiprocessors," *Journal of Parallel and Distributed Computing*, Vol. 10, No. 1, pp. 45-54, Sept. 1990.
37. S.P. Levitan, D.M. Chiarulli, R.G. Melhem, "Coincident Pulse Techniques for Multiprocessor Interconnection Structures," *Applied Optics*, Vol. 29, No. 14, pp. 2024-2033, 10 May, 1990.
38. R.G. Melhem, D.M. Chiarulli, S.P. Levitan, "Space Multiplexing of Waveguides in Optically Interconnected Multiprocessor Systems," *Computer Journal, British Computer Society*, Vol. 32, No. 4, pp. 362-369, Aug. 1989.
39. C.C. Weems, S.P. Levitan, A.R. Hanson, E.M. Riseman, J.G. Nash, D.B. Shu, "The Image Understanding Architecture," *International Journal of Computer Vision*, Vol. 2, pp. 251-282 (1989).

40. "D. Chiarulli, R. Melhem, S. Levitan, Using Coincident Optical Pulses for Parallel Memory Addressing," *Computer*, Vol. 20, No. 12, pp. 48-57, Dec. 1987.

Chapters in Edited Books:

1. Yan Fang, Steven P. Levitan, Donald M. Chiarulli, Denver H. Dash, "Alternative Architectures for NonBoolean Information Process Systems," (in) *Emerging Nanoelectronic Devices*, An Chen (Editor), James Hutchby (Editor), Victor Zhirnov (Editor), George Bourianoff, (Editor), Chapter 24, John Wiley & Sons, Ltd. (ISBN: 978-1-118-44774-1), 576 pages, January 2015.
2. Steven P. Levitan, Donald M. Chiarulli, Timothy P. Kurzweg, Jose A. Martinez, Samuel J. Dickerson, Michael M. Bails, David K. Reed, Jason M. Boles, "CAD Tools for Multi-Domain Systems on Chips," (in) *Model-Based Design of Embedded Systems*, G. Nicolescu and P. Mosterman, Eds. Chapter 20, pp. 643-696, Taylor & Francis Group, Boca Raton, Florida, 2009.
3. R. Melhem, G. Gravenstreter, D. Chiarulli, S. Levitan, "The Communication Capabilities of Partitioned Optical Passive Stars Networks," (in) *Parallel Computation Using Optical Interconnections*, Keqin Li, Yi Pan, and S.Q. Zheng, Eds. Chapter 4, pp. 77-97, Kluwer, 1998.
4. R.G. Melhem, C. Qiao, D.M. Chiarulli, S.P. Levitan, "Reconfiguration and Routing in Interconnection Networks using Time Division Multiplexing," (in) *Parallel Computing: Paradigms and Applications*, Albert Y. Zomaya, Ed., Chapter 10, International Thomson Computer Press, 1996.
5. T.W. Berger, G. Barrionuevo, S.P. Levitan, D.N. Krieger, R.J. Sclabassi, "Nonlinear Systems Analysis of Network Properties of the Hippocampal Formation," (in) *Learning and Computational Neuroscience: Foundations of Adaptive Networks*, M. Gabriel, J.W. Moore, Eds., pp. 283-352, M.I.T. Press, 1990.
6. R.J. Sclabassi, D.N. Krieger, J. Solomon, J. Samosky, S.P. Levitan, T.W. Berger, "Theoretical Decomposition of Neuronal Networks," (in) *Advanced Methods of Physiological System Modeling*, Vol. 2, V.Z. Marmarelis, Ed., pp. 129-146, Plenum Press, New York, 1989.
7. S.P. Levitan, A.R. Martello, R.M. Owens, M.J. Irwin, "Using VHDL as a Language for Synthesis of CMOS VLSI Circuits," (in) *Computer Hardware Description Languages and their Applications*, J.A. Darringer, F.J. Ramming, Eds., Elsevier, Amsterdam, 1989, pp. 331-345, IFIP WG 10.2, 9th Intl. Symp. On Computer Hardware Description Languages, Washington DC, June 1989.
8. S.P. Levitan, C.C. Weems, A.R. Hanson, E.M. Riseman, "The UMass Image Understanding Architecture," (in) *Parallel Computer Vision*, Leonard Uhr, Ed., Academic Press, New York, 1987, pp. 215-248.
9. S.P. Levitan, "Measuring Communication Structures in Parallel Architectures and Algorithms," (in) *The Characteristics of Parallel Algorithms*, L. Jamieson, D. Gannon, R. Douglass, Eds., Cambridge, MA, MIT Press, 1987, pp. 101-137.
10. S.P. Levitan, C.C. Weems, E.M. Riseman, "Signal to Symbols: Unblocking the Vision Communications/Control Bottleneck," (in) *VLSI Signal Processing* (Proceedings of the 1984 IEEE Workshop on VLSI Signal Processing at University of Southern California, Los Angeles, CA, November 27-29, 1984), IEEE Press, New York, NY, 1984, pp. 411-420.

11. C.C. Weems, S.P. Levitan, D.T. Lawton, C.C. Foster, "A Content Addressable Array Parallel Processor and Some Applications," (in) *Image Understanding*, Proceedings of the DARPA Workshop, Arlington, VA, June 23, 1983, Science Applications, Inc., Report Number SAI-84-176-WA.

Refereed Conference Proceedings (full papers):

1. Donald M. Chiarulli, Brandon Jennings, Yan Fang, Andrew J. Seel, Steven P. Levitan, "A Computational Primitive for Convolution based on Coupled Oscillator Arrays," **International Symposium on Very Large Scale Integration (ISVLSI 2015)**, paper No. 144, Montpellier, France, July 8-10, 2015.
2. Yan Fang, Victor V. Yashin, Donald M. Chiarulli, Steven P. Levitan, "A Simplified Phase Model for Oscillator Based Computing," **International Symposium on Very Large Scale Integration (ISVLSI 2015)**, paper No. 148, Montpellier, France, July 8-10, 2015.
3. Yan Fang, Victor V. Yashin, Andrew J. Seel, Brandon Jennings, Reggie Barnett, Donald M. Chiarulli, Steven P. Levitan, "Modeling Oscillator Arrays for Video Analytic Applications," **International Conference on Computer Aided Design (ICCAD 2014)**, paper 2B.3, pp. 86-91, San Jose, CA, November 2-6, 2014. DOI: 10.1109/ICCAD.2014.7001336
4. Brandon B. Jennings, Reggie Barnett, Chet Gnegy, John A. Carpenter, Yan Fang, Donald M. Chiarulli, Steven P. Levitan, "HMAX Image Processing Pipeline with Coupled Oscillator Acceleration", Paper 102, **IEEE International Workshop on Signal Processing Systems (SiPS 2014)**, pp. 1-6, Belfast, U.K., Oct 20-22, 2014. DOI: 10.1109/SiPS.2014.6986101
5. Samuel J. Dickerson, Stefano Coraluppi, Craig Carthel, Steven Levitan, Donald Chiarulli, "A Multi-Target Tracking Sensor Platform for Dielectrophoresis-Based Characterization of Cells," Paper 119, **IEEE EMBS Special Topic Conference on Healthcare Innovation & Point-of-Care Technologies (HICPT'14)**, pp. 137-140, Seattle Washington, October 8-10, 2014. DOI: 10.1109/HIC.2014.7038893
6. Samuel J. Dickerson, Donald M. Chiarulli, Steven P. Levitan, Craig Carthel and Stefano Coraluppi, "Dielectrophoresis-Based Classification of Cells Using Multi-Target Multiple-Hypothesis Tracking," Paper 411, **36th Annual International IEEE EMBS Conference (EMBC'14)**, pp. 1402-1405, Chicago, Illinois, August 26-30, 2014. DOI: 10.1109/EMBC.2014.6943862
7. Stefano Coraluppi, Craig Carthel, Samuel J. Dickerson, Donald Chiarulli and Steven Levitan, "Feature-Aided Multiple-Hypothesis Tracking and Classification of Biological Cells," Paper 11, **17th International Conference on Information Fusion (FUSION 2014)**, pp. 1-8, Salamanca, Spain, July 7-10, 2014.
8. Matthew J. Cotter, Yan Fang, Steven P. Levitan, Donald M. Chiarulli and Vijaykrishnan Narayanan, "Computational Architectures Based on Coupled Oscillators," **IEEE Computer Society Annual Symposium on VLSI (ISVLSI 2014)**, pp. 130-135, (poster) Tampa, FL, July 9-11, 2014. DOI: 10.1109/ISVLSI.2014.87
9. Vijaykrishnan Narayanan, Suman Datta, Gert Cauwenberghs, Donald M. Chiarulli, Steven P. Levitan and Philip Wong "Video Analytics Using Beyond CMOS Devices," **Design Automation & Test in Europe (DATE 2014)**, pp. 1-5, (Paper 12.1.3), Dresden, Germany, March 24-28, 2014. DOI: 10.7873/DATE.2014.357

10. Steven P. Levitan, Yan Fang, Denver H. Dash, Tadashi Shibata, Dmitri E. Nikonov, George I. Bourianoff, "Non-Boolean Associative Architectures Based on Nano-Oscillators," **13th IEEE Int'l Workshop on Cellular Nanoscale Networks & their Applications (CNNA 2012)**, pp. 1-6, Turin, Italy, August 29-31, 2012. DOI: 10.1109/CNNA.2012.6331473
11. Tadashi Shibata, Renyuan Zhang, Steven P. Levitan, Dmitri Nikonov, George Bourianoff, "CMOS Supporting Circuitries for Nano-Oscillator-Based Associative Memories," **13th IEEE Int'l Workshop on Cellular Nanoscale Networks & their Applications (CNNA 2012)**, pp. 1-5, Turin, Italy, August 29-31, 2012. DOI: 10.1109/CNNA.2012.6331464
12. Alex M. Schaefer, Samuel J. Dickerson, Larry R. Foulke, Daniel G. Cole, Steven P. Levitan, "Design of the U-PANTHER Desktop Nuclear Plant Simulator," **2012 ANS Annual Meeting (Nuclear Science and Technology: Managing the Global Impact of Economic and Natural Events)**, ANS's Volume 106, pp. 133-135, 2012 Transactions, Chicago, Illinois, June 24-28, 2012.
13. Jesse S. Randall, Venugopal M. P. Nair, Larry R. Foulke, Steven P. Levitan, Daniel G. Cole, "Development of Reactor Core Neutronics and Thermal Physics for the U-PANTHER Simulator," **2012 ANS Annual Meeting (Nuclear Science and Technology: Managing the Global Impact of Economic and Natural Events)**, ANS's Volume 106, pp. 931-934, 2012 Transactions, Chicago, Illinois, June 24-28, 2012.
14. Joseph Jezak, Charles Berdanier, Steven Levitan, Donald Chiarulli, "Accelerated DSP Functions on the CBE for the X-Midas DSP Toolkit," **2012 International Waveform Diversity and Design Conference**, (Imaging Techniques Session), Kauai, Hawaii, January 22-27, 2012.
15. Jeff Brinkhus, Joseph Jezak, Charles Berdanier, Steven Levitan, Donald Chiarulli, "Hybrid Clutter Canceller with Feedback Guided Predictive Filtering on a Heterogeneous Parallel Processing System," **2012 International Waveform Diversity and Design Conference**, (Poster), Kauai, Hawaii, January 22-27, 2012.
16. Joseph Jezak, Guy Gadola, Charles Berdanier, Steven Levitan, Donald Chiarulli, "Configurable Clutter Models for Radar Simulations," **2012 International Waveform Diversity and Design Conference**, (Radar Session 3), Kauai, Hawaii, January 22-27, 2012.
17. Alex K. Jones, Steven P. Levitan, "Industrially Inspired Just-in-Time (JIT) Teaching," **2011 International Conference on Microelectronic Systems Education (MSE)**, pp. 9-12, San Diego, CA, June 5-6, 2011. DOI: 10.1109/MSE.2011.5937079
18. P. Wang, X. Wang, Y. Zhang, H. Li, S.P. Levitan, Y. Chen, "Non-persistent Errors Optimization in Spin-MOS Logic and Storage Circuitry," **IEEE International Magnetism Conference (INTERMAG 2011)**, (Poster), FR-01, Taipei, Taiwan, April 25-29, 2011.
19. Kelli Ireland, Joseph Jezak, Steven Levitan, Donald Chiarulli, "Scalable Arbitration of Partitioned Bus Interconnection Networks in 3D-IC Systems," **2nd International Workshop on Network on Chip Architectures (NoCArc'09)**, Paper No. 20, Session IV, pp. 77-82, New York, NY, December 12, 2009.
20. Samuel J. Dickerson, Steven P. Levitan, Donald Chiarulli, "3D Integrated Circuits for Lab-on-Chip Applications," **The IEEE International Conference on 3D System Integration (3D IC)**, pp. 1-8, San Francisco, CA, September 28-30, 2009. DOI: 10.1109/3DIC.2009.5306597

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Invited Presentations and Workshops:

1. Steven P. Levitan, Donald M. Chiarulli, Anna C. Balazs, "Oscillator Based Computing," **NSF/SRC Workshop on Energy Efficient Computing**, Arlington, VA, April 14-15, 2015.
2. "Using Coupled Oscillators as Non-Boolean Operators for Associative Processing," **Qualcomm**, San Diego, CA, March 12, 2014.
3. Steven Levitan, Yan Fang, Donald M. Chiarulli, "Using Analog Memory With Coupled Oscillators for Pattern Recognition Applications," **5th Non-Volatile Memory Workshop (NVMW)**, San Diego, CA, March 9-11, 2014.
4. George I. Bourianoff, Dmitri E. Nikonov, Mathew Puffal, Tadashi Shibata, Wolfgang Porod, Gyorgy Csaba, Dana Weistein, Tamas Roska, Steven P. Levitan, Daniel Hammerstrom, Denver H. Dash, "Towards a Bayesian Processor Implemented with Oscillatory Nanoelectronic Arrays," **13th IEEE Int'l Workshop on Cellular Nanoscale Networks & their Applications (CNNA 2012)**, (Keynote), Turin, Italy, August 29-31, 2012.
5. "Tenure: What It Takes?," Young Faculty Workshop at the **49th IEEE/ACM Design Automation Conference (DAC'12)**, San Francisco, CA, June 3, 2012.
6. "Non-Boolean Associative Architectures Using Nano-Oscillator Devices," **DARPA/MTO Unconventional Computing Systems for Real-Time Sensor Data Analysis Workshop**, Arlington, VA, March 14-15, 2012.
7. "CAD: What's it all about?," **CRA-W/CDC Workshop on Diversity in Design Automation and Test**, Session - A Perspective of the Past 40 Years and Present, University of Pittsburgh, Pittsburgh, PA, May 23, 2011.

8. "Computing: Instructions & Data or Devices & Interconnect?" **Ultra Low Power Application Specific Analog-digital Systems Workshop**, Intel Corporation, Mountain View, CA, September 9, 2010.
9. S.P. Levitan, D.M. Chiarulli, "Massively Parallel Processing: It's Deja vu all over again," (Invited) **Proceedings of the 46th IEEE/ACM Design Automation Conference (DAC'09)**, pp. 534-538, San Francisco, CA, July 26-31, 2009.
10. S.P. Levitan and M.J. Irwin, "Getting an Academic Job," Young Faculty Workshop at the **46th IEEE/ACM Design Automation Conference (DAC'09)**, San Francisco, CA, July 25, 2009.
11. "Zooming out and Scaling up: from 1 to 1000 Cores," Session 8, **MPSoC 8th International Forum on Application-Specific Multi-Processor SoC**, Valkenburg a.d. Geul, Netherlands, June 23-27, 2008.
12. "Notes on Computation for Physics," **Department of Theoretical Physics, Oxford University**, February 14, 2008.
13. "The Meaning of Computation," **Theoretical Foundations of Molecular Biology Seminar, Balliol College, Oxford University**, February 7, 2008.
14. "CAD for Mixed-Technology Micro-Systems," **Samsung Electronics**, Seoul, Korea, January 25, 2008.
15. "Projects in Computer Science and Engineering," **Heriot-Watt University, Edinburgh**, November 28, 2007.
16. "Metaphors for Concurrent Computation," **Oliver Smithies Lecture, Balliol College, University of Oxford**, November 26, 2007.
17. "Design Challenges for the Next Generation of Integrated Circuits," **Oliver Smithies Lecture, Balliol College, University of Oxford**, November 19, 2007.
18. "Life on the Fringe: Projects in Computer Science and Engineering," **Department of Computer Science, University of Pittsburgh**, March 27, 2007.
19. "Metaphors for Concurrent Computation," **MPSoC 6th International Forum on Application-Specific Multi-Processor SoC**, Estes Park, CO, August 14-18, 2006.
20. "Why smart pixels never graduated, and other lessons from the birth of the VLSI era," **Los Alamos National Laboratory**, Los Alamos, NM, May 16, 2006.
21. "Why smart pixels never graduated, and other lessons from the birth of the VLSI era," **Nanoscale Cellular Array Architectures (NCAA) Workshop**, Santa Fe, NM, January 19-20, 2006.
22. **Computing Research Association (CRA) Grand Research Challenges Conference** (participant), Aptos, CA, December 4-7, 2005.
23. **National Science Foundation (NSF) Workshop on Architectures for Silicon Nanoelectronics and Beyond** (participant), Portland, OR, September 13-14, 2005.
24. "Multi-level Co-Simulation of Mixed Technology Microsystems," Session 6, **MPSoC 5th International Forum on Application-Specific Multi-Processor SoC**, Relais de Margaux, France, July 11-15, 2005.
25. S.P. Levitan, D.M. Chiarulli, "Power Efficient Communication using Multi-Bit-Differential Signaling," **IEEE/LEOS 16th Annual Workshop on Interconnections within High-Speed Digital Systems**, Santa Fe, NM, May 8-11, 2005.

26. B.A. Slavin, S.P. Levitan, G.A. Buxton, "Modeling of Crack Formation and Failure of Surface Coatings," **Engineering Sustainability 2005, The Mascaro Sustainability Initiative, University of Pittsburgh**, Pittsburgh, PA, April 10-12, 2005.
27. S.P. Levitan, D.M. Chiarulli, "Multi-Level Mixed-Technology System-Level Simulation," **3rd International Conference Computational Modeling and Simulation of Materials (CIMTEC 2004)**, Acireale, Sicily, Italy, May 30- June 4, 2004.
28. "Nano = 1/Giga, How will we design these systems?" **National Nano-technology Initiative Workshop on Grand Challenges in Nano-electronics, -photonics, and -magnetics**, Washington, DC, February 11-13, 2004.
29. "Giga = 1/Nano: CAD Tools and Modeling Challenges for Mixed Technology Microsystems," **International Workshop on Logic and Synthesis (IWLS)**, New Orleans, LA, June 6, 2002.
30. S.P. Levitan, T.P. Kurzweg, J.A. Martinez, D.M. Chiarulli, S. Martinez, B. Courtois, "Diffractive Optical Modeling at the System Level," **OSA Annual Conference**, Long Beach, CA, 14-18 October 2001.
31. "Bootstrapping OMEM device models to the system design level: How good is good enough?" **MSM2001**, Hilton Head Island, South Carolina, 19-21 March 2001.
32. "CAD Tools and Modeling Challenges for Optoelectronic Systems," **TIMA Laboratory**, Grenoble, France, December 15, 2000.
33. "Multi-Level Simulation of Mixed-Technology Micro-Systems," **Marconi International**, U.K., September 14, 2000.
34. S.P. Levitan, J.A. Martinez, P.J. Marchand, D.M. Chiarulli, "Modeling and Simulation of Optical MEMS for Free Space Switching," **Progress in Electromagnetics Research Symposium (PIERS 2000)**, Cambridge, MA, July 5-14, 2000.
35. "Multi-Level Simulation of Mixed-Technology (Optical-Electrical-Mechanical) Micro-Systems," **Stanford University**, Stanford, CA, May 2000.
36. "Giga = 1/nano: CAD challenges for Giga-scale Mixed-Technology Micro-Systems," **DARPA workshop on Next Generation CAD Tools for Gigascale Integrated Mixed Technology System-on-a-chip**, Arlington, VA, May 2000.
37. "Modeling Optical MEMS with Chatoyant," **Ptolemy Workshop, University of California, Berkeley**, (poster), February 1999.
38. "System Level Modeling and Simulation of Optical/Electronic/Mechanical Systems," **DARPA Composite CAD PI Meeting**, Boston, MA, June 1998.
39. "Integrating Optical Storage into Real-World Computing Systems," **ARO Asilomar Workshop on Rare Earths for 3-D Optical Devices**, Asilomar, CA, Apr. 1998.
40. "Forging a Computer Aided Design Tool for Digital Optoelectronic Systems," **Workshop on Optics and Computer Science, IPPS'97**, (invited presentation), Geneva, Switzerland, Apr. 1997.
41. "Modeling Free Space Optoelectronic Systems using Ptolemy," **Ptolemy Workshop, University of California, Berkeley**, Berkeley, CA, Mar. 1997.
42. "CAD Tools for modeling Free Space Optoelectronic Information Processing Systems," **DARPA Mixed Technology CAD Review**, Washington, DC, Dec. 1996.
43. "Towards a Computer Aided Design System for Digital Optoelectronic Systems," **IEEE-CS Annual Workshop on VLSI**, Clearwater Beach, FL, Nov. 1996.

44. "A Computer Aided Design System for Digital Optoelectronic Systems," **Hewlett Packard Palo Alto Research Center**, Palo Alto, CA, Nov. 1996.
45. "Using Ptolemy for Free Space Optoelectronic System Design," **University of California, Berkeley**, Berkeley, CA, Nov. 1996.
46. "Reconfigurable Optoelectronic Interconnection Networks," **University of Melbourne**, Melbourne, Victoria, Australia, Feb. 1996.
47. "Optoelectronic Interconnection Networks for Parallel Processors," **University of Sydney**, Sydney, NSW, Australia, Feb. 1996.
48. "Computer-Aided Design of Optoelectronic Interconnection Systems," **University of Massachusetts Amherst**, Amherst, MA, Nov. 1995.
49. "The Impact of the World Wide Web on Electronic Design and EDA," (panelist), **32nd IEEE/ACM Design Automation Conference**, p. 586, San Francisco, CA, June 1995.
50. "VHDL Research at the University of Pittsburgh," **Digital Equipment Corporation**, Littleton, MA, May 1995.
51. "Routing and Reconfiguration in Optoelectronic Multiprocessor Interconnection Networks," **AT&T, Bell Laboratories**, Holmdel, NJ, Apr. 1995.
52. "Reconfigurable Optical Interconnection Networks," **Budker Institute of Nuclear Physics**, Novosibirsk, Russia, Oct. 1994.
53. "CAD for Programmable Logic Devices," **Budker Institute of Nuclear Physics**, Novosibirsk, Russia, Oct. 1994.
54. "Routing and Reconfiguration in Optoelectronic Information Processing Systems," **University of Colorado Boulder**, Optoelectronic Computing Systems Center, Boulder, CO, Apr. 1994.
55. "State Sequence Control for Partitioned Optical Passive Star Networks," **University of California San Diego**, La Jolla, CA, Dec. 1993.
56. "VHDL Synthesis - Current Reality & Future Vision," **VHDL International Users Forum**, San Jose, CA, Oct. 1993 (Panel Chair).
57. "Bandwidth as a Virtual Resource in Multiprocessor Interconnection Networks," **University of Colorado Boulder**, Optoelectronic Computing Systems Center, Boulder, CO, Sept. 1993.
58. "What's Inside Computers?" **Albuquerque Academy**, Albuquerque, NM, Sept. 1993.
59. "Getting Started with VLSI," (seminar, short course), **University of Colorado Boulder**, Optoelectronic Computing Systems Center, Boulder, CO, Aug. 1993.
60. "Bandwidth as a Virtual Resource in Optical Interconnection Networks," **NEC Corporate Research Center**, Princeton, NJ, June 1993.
61. "Optical Technology for Next Generation Parallel Supercomputers," **Pittsburgh Supercomputer Center**, Pittsburgh, PA, Apr. 1993.
62. "Reconfigurable Optical Interconnects," (Organizer and Session Chair), **1993 IEEE Winter VLSI Workshop**, Asilomar, CA, Feb. 1993.
63. "Bandwidth as a Virtual Resource in Multiprocessor Interconnection Networks," **University of Pittsburgh**, Department of Computer Science, Pittsburgh, PA, Nov. 1992.
64. "Bandwidth as a Virtual Resource in Multiprocessor Interconnection Networks," **University of California San Diego**, La Jolla, CA, Nov. 1992.

65. "Optical MIMD Architectures," **AFOSR Workshop on Reconfigurable Optical Interconnects**, Boulder, CO, Mar. 1992.
66. "Panel on the Future of Optics in Computing," (Panel Chair), **Supercomputing '91**, Albuquerque, NM, Nov. 1991.
67. "Keystone: A VHDL Simulation and Synthesis Environment for VLSI Design," **IBM Thomas J. Watson Research Center**, Hawthorne, NY, Oct. 1991.
68. "Optical Interconnection Structures For Multiprocessor Applications," **University of Pittsburgh**, Department of Electrical Engineering, Pittsburgh, PA, Jan. 1991.
69. "Using Keystone for Verification and Synthesis," **Viewlogic Systems**, Marlboro, MA, Sept. 1990.
70. "Optical Parallel Processing," **Workshop on Optical Neural Networks**, Jackson Hole, WY, Feb. 1990.
71. "Addressing and Control in Optical Interconnection Networks for Hybrid Multiprocessors," **University of Colorado Boulder**, Optoelectronic Computing Systems Center, Boulder, CO, Feb. 1990.
72. "The Keystone Silicon Synthesis Project," **Viewlogic Systems**, Marlboro, MA, Jan. 1990.
73. "Silicon Synthesis: A VHDL Approach," IEEE Student Chapter, **Pennsylvania State University**, State College, PA, Nov. 1989.
74. "Experiences Using VHDL in the Classroom," **VHDL Users Group Meeting**, Sheraton Hotel, Redondo Beach, CA, Oct. 1989.
75. "Synthesis of CMOS Structures from VHDL," **VHDL Methods Workshop**, University of Virginia, Charlottesville, VA, Aug. 1989.
76. "From VHDL to Layout," **VHDL Users Group Meeting**, Sheraton Hotel, Redondo Beach, CA, Oct. 1988.
77. "An Integrated Capture and Simulation Tool for Digital Designs," The **Pennsylvania State University**, State College, PA, Sept. 1988.
78. "Architectures and VLSI," **Workshop on Special Computer Architectures for Robotics**, International Conference on Robotics and Automation, Philadelphia, PA, Apr. 1988.
79. "Teaching VLSI as a Capstone Course," **NSF/MOSIS Undergraduate Education Workshop**, National Science Foundation, Washington, DC, Nov. 1987.
80. "Parallel Algorithms and Architectures: A Programmers Perspective," **Taxonomy of Parallel Algorithms Workshop**, Los Alamos National Laboratory, Santa Fe, NM, Nov. 1983.
81. "Topics in Computer Architecture," **Smith College**, Northampton, MA, Feb. 1983.

GRANTS

Pending:

Intel Corporation "Scalable Event-driven Neuromorphic Learning Machines for Human-Centric Computing," \$2,611,798 (\$634,050 for Pitt) (PI) with Donald Chiarulli, Gert Cauwenberghs (PI-UCSD), Emre Neftci, Nikil Dutt, Jeff Krichmar (PI-UCI).

Current:

National Science Foundation “Collaborative Research: Visual Cortex on Silicon,” CCF-1317373, \$9,842,000 (\$500,000 for Pitt), 10/1/13-9/30/18, (Co-PI) with Vijaykrishnan Narayanan (PI), Pennsylvania State University and 11 others.

National Science Foundation “Research Experiences for Undergraduates (REU) Supplement for “Collaborative Research: Visual Cortex on Silicon,” CCF-1317373 \$16,000, 6/1/15 (PI).

National Science Foundation “Research Experiences for Undergraduates (REU) Supplement for “Collaborative Research: Visual Cortex on Silicon,” CCF-1317373 \$16,000, 5/7/14 (PI).

National Science Foundation “INSPIRE Track 1: Sensing and Computing with Oscillating Chemical Reactions,” DMR-1344178, \$799,655, 9/15/13-9/14/18, (Co-PI) with Anna C. Balazs (PI).

Defense Advanced Research Projects Agency “Revolutionary Analog-based Probabilistic Inference Devices for Unconventional Processing of Signals for Intelligent Data Exploitation (RAPID-UPSIDE),” Prime Award: #HR0011-13-C-0052, Subcontract from HRL: 12105-30XXXX-DS \$771,679, 3/1/13-5/31/17, (PI) with Donald M. Chiarulli.

Forte Design Systems “University Program Software,” value \$3,000, 2012-2013.

Intel Corporation Support “A Feasibility Study Concerning Ultra Low Power Non-Boolean Systems,” \$75,000, unrestricted gift, 5/11; renewed \$75,000, 5/12; renewed \$8,000, 5/13.

Telcordia Technologies “Support for Optical CAD research,” \$50,000, unrestricted gift, 12/99 - .

National Science Foundation “Application to Use DARPA/NSF Service (MOSIS) for Fabrication of Prototype Quantities of Custom Integrated Circuits to Support Education,” \$15,200, 10/87. Renewed 6/89-9/90, \$14,900, Renewed 9/90-9/91, \$5,940, Additional funding 1/91, \$6,000, Renewed 10/91-9/92, \$6,525, Renewed 10/92-9/93, \$5,400, Renewed 1/93-9/93, \$6,100, Additional funding 1/95-9/95, \$6,400 Renewed 9/95-9/96, \$7,395, Additional funding 1/96, \$4,590, Renewed 9/96-9/97, \$6,630 Additional funding 1/97, \$5,100, Renewed 9/97-4/98, \$5,355, Additional funding 1/98, \$6,120, Renewed 9/98-9/99, \$2,200, Additional funding for 6 projects 2/99, (PI).

Completed:

Dynetics Inc./Air Force “Supplement to: Real Time Signal Processing Benchmarks (RTSPB),” \$449,967, 10/1/10-5/31/13, (Co-PI) with D.M. Chiarulli.

National Science Foundation “Collaborative Research: Planning Grant: Nexys: Next Generation Electronic System Design,” \$11,500, 1/1/12-12/31/12, (Co-PI) with Alex K. Jones (PI), Jun Yang, Yiran Chen.

The Technology Collaborative (TTC) PA Assistive and Intelligent Systems Technology Commercialization Initiative (PATCI) “A Portable Lab-On-Chip Cytometer for CD4/CD8 Lymphocyte Counts,” \$25,000, 9/30/11-6/30/12, (Co-PI) with S.J. Dickerson (PI) and D.M. Chiarulli (Co-PI).

The Technology Collaborative (TTC) Student Entrepreneur Contest (University of Pittsburgh Provost) “Lab-on-Chip Instrumentation for Separation and Assay of Biological Particles,” \$5,800, 11/1/10-12/31/11, (PI) with S.J. Dickerson and D.M. Chiarulli.

- Nuclear Regulatory Commission** “Development of a Desktop Nuclear Plant Operations Simulator for Graduate and Undergraduate Education,” \$102,798, 7/1/10-12/31/11, (PI) with L.R. Foulke and M.K. Chyu.
- University of Pittsburgh Provost Innovation in Education** “Simulating the World,” \$20,175, 5/1/10-4/30/11, (PI).
- Dynetics Inc./Air Force** “Real Time Signal Processing Benchmarks (RTSPB),” \$272,015, 7/1/08-9/30/10, (Co-PI) with D.M. Chiarulli.
- National Science Foundation** “IGERT: Sustainability Initiative in Engineering,” DGE-0504345, \$3,400,000, 9/1/05-8/31/10, E.J. Beckman (PI) with 23 colleagues.
- Mascaro Center for Sustainable Innovation** “Building Information Modeling for Construction and Demolition Waste Recycling,” \$50,556, 7/1/09-6/30/10, (PI) with D.M. Chiarulli.
- The Technology Collaborative (TTC)** “Digital Sandbox Infrastructure,” \$50,000, 6/1/07-5/31/10, (Co-PI) with Alex K. Jones.
- National Science Foundation** “Nonlinear Model Order Reduction for Behavioral Models of Emerging Technologies,” CCF-0541150, \$200,000, 5/1/06-4/30/10, (PI) with D.M. Chiarulli.
- National Science Foundation** CCF-0849141, “Supplement to CCF-0541150: Proposal for Faculty Workshop at ICCAD 2008,” \$15,000, 5/1/06-4/30/10, (PI) with D.M. Chiarulli.
- Innovation Works: University Innovation Grant Fund**, “Rapid Isolation, Purification, and Assay of Nano-scale Biological Particles,” \$50,000, 5/1/08-4/30/09, (Co-PI) with D.M. Chiarulli.
- Semiconductor Research Corporation** “Support for Design Automation Young Faculty Workshop,” \$5,000, 2/1/09, (PI), (Direct funding to 46th Design Automation Conference).
- Mascaro Sustainability Initiative** “Advanced Fiber Optical Sensors for Structural Health Monitoring of Civil and Energy Transportation Facilities,” \$46,440, 7/1/07-6/30/08, (Co-PI) with K.P. Chen.
- National Science Foundation** C-CR0530070, “REU Supplement to C-CR0306325,” \$12,000, 08/01/03-7/31/07, (PI) with D. M. Chiarulli.
- National Science Foundation** C-CR0432540, “REU Supplement to C-CR0306325,” \$6,000, 08/01/03-7/31/07, (PI) with D. M. Chiarulli.
- National Science Foundation** “Behavioral Modeling of MEMS Sensors for System Level Design,” C-CR0306325, \$240,000, 8/1/03-7/31/07, (PI) with D. M. Chiarulli.
- Small Business Technology Transfer (STTR) Program/Navy** “Next Generation Radar and Signal Processing Using the Cell Broadband Engine,” N00014-06-M-0208, \$99,382, 7/1/06-4/30/07, with Ultra Communications Inc., (Co-PI) with D.M. Chiarulli.
- John A Swanson Micro and Nano Systems Laboratory/University of Pittsburgh** “Three Dimensional Fiber Strain and Vibration Sensors for Structural Health Monitoring and Acoustic Sensing Using Microstructural Fibers,” \$35,000, 9/1/05-8/31/06, (Co-PI) with K.P. Chen.

Pittsburgh Digital Greenhouse “Area, Power, and Pin Efficient Chip I/O using Multi-Bit-Differential Signaling,” \$246,206, 7/1/04-8/31/06, (Co-PI) with D.M. Chiarulli.

John A. Swanson, "Center for Micro and Nano Systems," \$1,400,000, 2002-2006, Tom Cain (PI) with 16 colleagues.

Mascaro Sustainability Initiative “Modeling the Failure and Self-Healing of Surface Coatings for Green Construction,” \$55,000, 5/1/04-12/31/05, (PI) with A. C. Balazs.

Semiconductor Research Corporation “Support for Design Automation Summer School (DASS),” \$5,000, 6/1/05, (PI) with Kartik Mohanram, Rice University (Direct funding to 42nd Design Automation Conference).

John A Swanson Micro and Nano Systems Laboratory/University of Pittsburgh “Validation of Predictive Computer Aided Design Models via Fabrication and Testing of MEM Systems,” \$4,225 (laboratory costs), 1/24/05, (PI).

John A Swanson Micro and Nano Systems Laboratory/University of Pittsburgh “Validation of Predictive Computer Aided Design Models via Fabrication and Testing of MEM Systems,” \$35,000, 8/1/04-7/31/05, (Co-PI) with D.M Chiarulli, Michael Lovell.

Pittsburgh Digital Greenhouse “A State of the Art CAD/CASE Classroom/Laboratory,” \$87,150, 1/1/02-12/31/04, (Co-PI) with J.T. Cain, R.R Hoare, R.G. Hoelzeman, I. Korteve, and M.H. Mickle.

Pittsburgh Digital Greenhouse “Investigation of High-Speed Optoelectronic Receivers in SiGe,” \$283,649, 1/1/02-12/31/03, with D. M. Chiarulli.

Schott Fiber Optics “Investigation of High Speed Crossbar Switch Based on Imaging Fiber Bundles,” \$50,000, 1/1/02-12/31/02, (Co-PI) with D.M. Chiarulli.

National Science Foundation “REU Supplement to C-CR9988319,” \$22,500, 09/01/00- 8/31/03.

Defense Advanced Projects Research Agency / AFOSR “Computer Aided Design of Multi-Domain Micro-Systems,” \$2,100,000, AFOSR: #F49620-01-1-0536, 01NE233 (BAA 01-02), 9/15/01-9/14/03, with D. M. Chiarulli.

Pittsburgh Digital Greenhouse "SoC Faculty Start-up Package," \$700,000, 2001-2004, with Tom Cain (PI).

National Science Foundation “Design Automation for Micro-Scale Mixed Technology Systems,” \$638,293 C-CR 9988319, 9/15/00-9/14/03, with D. M. Chiarulli.

Microcosm Technologies/Coventor “Support for Research on Computer Aided Design for Optical Micro-Systems,” \$107,177, 6/1/00-5/31/03, with D. M. Chiarulli.

Pittsburgh Digital Greenhouse “Continuing Education Course Development,” \$524,026, 9/1/00-6/31/02, (Co-PI) with J. T. Cain, D. Chiarulli, R. Hoare, I. Kourteve, B. Childers.

Pittsburgh Digital Greenhouse “Parallel Chip Set for Wavelet-Based Motion Estimation for MPEG-4 Video Compression,” \$182,333, 8/1/00-2/1/02, (Co-PI) with C.C. Li, H. Chuang.

Pittsburgh Digital Greenhouse “Collaborative Systems on a Chip M.S. Degree,” \$83,801, 8/1/00-12/31/01, (Co-PI) with J. T. Cain.

Association for Computing Machinery - SIGDA "Creation of a SIGDA Internet Server," \$23,834, 12/92-6/98, additional funds: 1/94, \$9,600, 6/94, \$10,000, 2/95, \$19,110, 5/96, \$17,154, 5/97, \$26,412, 6/98, \$16,701, 6/99 \$16,152, 5/00, \$10,204, 9/01, \$8,247.71, (PI).

Pittsburgh Digital Greenhouse "Voice Input Interfaces to Embedded Systems," \$175,509, 1/1/00-12/30/00, (Co-PI) with D. M. Chiarulli, M. E. Pollack.

OnGuard Systems "Design and Implementation of Low Noise Sensor," \$40,000, 10/1/99-12/31/02.

Air Force Rome Laboratory "Low-Level Signal Processing Support for the Optoelectronic Memory System Interface," \$346,167, 9/1/99-2/28/01, (Co-PI) with D.M. Chiarulli.

National Science Foundation "Research Experiences for Undergraduates Supplement for Computer Aided Design and Simulation of Free Space Optoelectronic Information Processing Systems," \$10,000, Supplement to ECS-9616879, 10/1/97-10/31/98, additional funding \$20,000, 6/99-7/01, (Co-PI) with D.M. Chiarulli.

National Science Foundation "Computer Aided Design and Simulation of Free Space Optoelectronic Information Processing Systems," \$332,531, ECS-9616879, 6/1/97-7/31/00, (Co-PI) with D.M. Chiarulli.

Air Force Rome Laboratory "Associative Memory Study: Architectures and Technology," \$60,023, 10/1/99-9/30/00, (Co-PI) with D.M. Chiarulli.

DARPA/University of California, San Diego "System Level Simulation of Free Space Optoelectronic Systems," \$203,657, F30602-97-2-0122, 6/1/97-5/30/00, (Co-PI) with D.M. Chiarulli.

Provost Research Instrumentation Program "Interdisciplinary Research Equipment," \$17,441, 5/21/99, (Co-PI) with D. M. Chiarulli.

Schott Fiber Optics Inc. "Bandwidth Performance Tests on Optical Fiber Bundles," \$13,800 (est.), 10/98, (Co-PI) with D. M. Chiarulli.

Air Force Rome Laboratory "Optoelectronic Cache Memory Prototype," \$406,244, F30602-96-C-0206, 9/4/96-9/3/98, (Co-PI) with D.M. Chiarulli.

DARPA/Army Research Laboratory VCSEL Smart Pixel Foundry Service "A Reconfigurable Optoelectronic Computing Element," 10/97-6/98, (Co-PI) with D.M. Chiarulli.

Provost Research Instrumentation Program "Multidisciplinary Parallel Computer Cluster," \$25,000, 5/8/98, (Co-PI) with K. Johnson, Chemical Engineering, K. Jordan, Chemistry.

Xilinx, Inc. "Software grant: Xact FPGA Development software," \$4,200 (value), 1/96, (Co-PI) with D.M. Chiarulli. Additional "Hardware Donation," \$9,048 (value), XUP- 3883 7/98, (Co-PI) with D. M. Chiarulli.

Provost Research Instrumentation Program "Optical Breadboard and Components for Optoelectronic Computing System Research," \$15,570, 6/20/97, (Co-PI) with D.M. Chiarulli.

National Science Foundation "Software Capitalization Supplement: VHDL Compiler Technology," \$25,000, supplement to MIP-9102721, 7/1/95-6/30/96, (PI).

National Science Foundation “SGER: Computer Aided Design of Optoelectronic Information Processing Systems,” \$49,570, MIP-9421777, 4/1/95-3/31/96, (PI).

Air Force Office of Scientific Research “Reconfigurable Opto/Electronic Multiprocessor Interconnection Structures,” \$575,280, F-49620-93-1-0023, 11/92-4/96, (Co-PI) with D.M. Chiarulli, R.G. Melhem.

National Science Foundation “A Research Experiences for Undergraduates Site: Training Students to Model Polymer Behavior Through Computer Simulations,” \$150,000 DMR-9200174, 5/92-5/95, (CI) with A.C. Balazs (PI), R.L. Pinkus.

Engineering School Faculty Computing Infrastructure Program \$4,840, 4/94, (CI) with D. Setliff (PI), J. Cain, R. Hoelzeman.

Viewlogic, Inc., “Software grant: Powerview Software,” \$1,800 (value), 4/94, (Co-PI) with D.M. Chiarulli.

Xilinx, Inc. “Software/Hardware grant: Xact FPGA Development system and software,” \$6,600 (value), 3/94, (Co-PI) with D.M. Chiarulli.

National Science Foundation “Temporal Specification Verification,” \$218,292, MIP-9102721, 1/92-1/94, (PI).

National Science Foundation “Distribution of VLSI Design Software for Education and Research,” \$97,618, MIP-9101656, 7/91-7/93, (PI).

National Institute of Mental Health (ADAMHA) “Contribution of PCP and NMDA Receptors to Network Properties of the Hippocampal Formation,” \$600,000, MH45156-01A1, 4/90-3/93, (CI) with T.W. Berger (PI), R.J. Scabassi, G. Barrionuevo, D.N. Krieger. Program 1, part of \$2,270,700, Behavioral Neuroscience and Schizophrenia grant under Edward M. Stricker (PI).

ACM/SIGDA Travel Award One Faculty and one student to travel to 1991 international Conference on Computer Aided Design in Santa Clara, CA.

Office of Naval Research “Changes in Neuronal Network Properties Induced by Learning and Synaptic Plasticity: A Nonlinear Systems Approach,” \$394,591, N00014-87-K-0472 / N00014-90-J-4000, 6/87-5/90, (CI) with T.W. Berger (PI), R.J. Scabassi, G. Barrionuevo, D.N. Krieger, Supplement: 6/90-5/91, \$137,352, Supplement: 5/91-5/93.

Association for Computing Machinery/SIGDA “Equipment Support for Design Automation University Booth 1991-1993,” \$20,000, 11/90-6/93, (PI).

GUIDance Technologies “Unrestricted Gift,” \$17,929, 1/92-1/93, (PI).

Viewlogic Systems, Inc. “Software grant: Workview 750 system with 7400 simulation models,” \$13,000 (value), 6/91, (PI).

ACM/SIGDA Travel Award Two Faculty and two students to travel to 1991 Design Automation Conference in San Francisco, CA.

Air Force Office of Scientific Research “Coincident Pulse Techniques for Hybrid Electronic/Optical Computer Systems,” \$479,511, AFOSR-89-0469, 7/89-7/92, (Co-PI) with D.M. Chiarulli, R.G. Melhem.

- The Ben Franklin Technology Center of Western Pennsylvania** “Unix Graphic User Interface Development System,” \$117,731, 1/91-9/91, (Co-PI) with J.G. Bonar, GUIDance Technologies.
- Air Force Office of Scientific Research** 10/88-9/92, “A System Theoretic Investigation of Neuronal Network Properties of the Hippocampal Formation,” \$476,681, AFOSR-890197, (CI) with T.W. Berger (PI), R.J. Sclabassi, G. Barrionuevo, D.N. Krieger.
- National Science Foundation** “A Research Experiences for Undergraduates Site: Training Students to Use Computer Simulations as Research Tools,” \$42,000, DMR-9100818, 5/91-7/92, (CI) with A.C. Balazs (PI), J.F. Patzer.
- ACM/SIGDA Travel Award** Two students to travel to 1990 Design Automation Conference in Orlando, FL.
- National Science Foundation** “Instrumentation and Laboratory Improvement: Real Time Signal Processing Laboratory for Undergraduate Instruction,” \$68,435, ENG-8852496, 5/88-11/90, (CI) with L.F. Chaparro (PI), E.W. Kamen, S. Park.
- National Science Foundation** “Optical Technology for Network Based Multiprocessors,” \$49,983, MIP-8901053, 5/89-4/90, (Co-PI) with D. Chiarulli, R. Melhem.
- Air Force Office of Scientific Research** “Parallel Memory Using Coincident Optical Pulses,” \$50,132, AFOSR-88-0198, 7/88-7/89, (Co-PI) with D. Chiarulli, R. Melhem.
- National Science Foundation** “CISE Instrumentation: A VLSI Design and Test Facility for the University of Pittsburgh,” \$65,597, CCR-8716980, 1/88-1/89, (Co-PI) with D. Chiarulli.
- DARPA/University of Massachusetts, Subcontract** “Array Control Unit for the UMass Image Understanding Architecture,” \$28,069, 6/87-10/87, additional funds \$14,715, 10/87-12/87, additional funds \$8,922, 12/87-8/88, (PI).
- Central Research Development Fund, University of Pittsburgh** “An Integrated Tool Set for Digital Systems Design,” \$9,900, 7/87-7/88, (PI).
- Advanced Research Projects Agency/Army** “Image Understanding Architecture,” \$1,752,200, DACA76-86-C0015, 9/86-12/88, (CI) with A.R. Hanson, E.M. Riseman, C.C. Weems.
- Advanced Research Projects Agency/AFOSR** “Intermediate Level Computer Vision Processing Algorithm Development For Content Addressable Array Parallel Processor,” \$197,000, F49620-86-C-0041, 2/86-2/88, (CI) with A.R. Hanson, E.M. Riseman, C.C. Weems.
- Naval Research Laboratory** “Parallel Algorithms for Low, Intermediate, and High Level Image Understanding Tasks Using the Content Addressable Array Parallel Processor (CAAPP),” \$24,500, N00014-85-K-2008, 3/85-10/85, (CI) with A.R. Hanson, E.M. Riseman, C.C. Weems.
- National Science Foundation** “Computer Research Equipment (Infrastructure),” \$105,413, DCR-8505499, 6/85-6/86, (CI) with D. Carlson (PI), W. Kohler, M. Krishna, D. Pradhan, A. Singh, J. Stankovic, D. Towsley.

COURSES TAUGHT AND LABORATORIES DEVELOPED

- COE 0501 Digital Systems Laboratory** – Designed a new undergraduate laboratory course introducing design of digital systems using CAD tools, discrete, SSI, MSI, and FPGA components.
- EE 0142 Computer Organization** - Helped re-design this sophomore course using a new book and introduced the use of the VHDL hardware description language to allow students to use the computer to design and simulate components of computer architectures.
- EE 1145 Computer Applications** - Re-designed this junior level course to use C on UNIX (from Fortran on VMS) and teach data structures and simulation techniques as well as an introduction to numerical methods. Contents include: data structures, algorithm design and analysis, numerical techniques, and simulation.
- ECE 1170/1180 Modeling Simulation Software** - In this course students develop tools to model and simulate physical systems using C and C++. The course focuses on building software simulations of systems in terms of the underlying model objects, the world representations, the interactions between objects, a model of time, and the determination of convergence.
- EE 1192/2192 Introduction to VLSI** - Designed the first senior design course that required extensive use of high performance workstations. Worked with the school to create a workstation laboratory to use for this (and other) courses. Acquired, installed, debugged, and developed a large body of CAD tools for use in this laboratory.
- EE 2140 Introduction to System on a Chip** – Revised a project-oriented course in IP creation and use in a SoC environment using commercial CAD tools (SystemC/Forte/Synopsys tool flows).
- EE 2141 Verification and Validation of Digital Systems** – Introduced a senior design course introducing fundamentals of both simulation based and formal verification techniques with advanced commercial tools from Verity and IBM.
- EE 2162 Advanced Computer Architecture** - Re-designed this first level graduate course using a new text and a project component whereby students design and simulate a complete computer architecture. Contents include: review of the generations of computer systems, instruction sets and addressing modes, microprogramming, comparative analysis of CISC and RISC design styles.
- EE 2193 VLSI Design Project** - Developed an undergraduate course where students actually complete a design of a large MOS digital VLSI chip. This involved the constant refining and updating of the CAD software and interacting with NSF and the USC/ISI-MOSIS chip fabrication service.
- EE 3195 Optical Computer Architecture** – Developed a graduate seminar on devices, systems, and algorithms, which are used in both existing and proposed optical information processing systems.
- EE 3195 Seminar in CAD for VLSI** - Introduced a new course, which includes logic synthesis, simulation and physical design. The course has a major design project where students develop or extend an existing CAD tool.

Laboratory Development

- SoC Design and Verification Laboratory
- Undergraduate Computer Engineering Digital Systems Laboratory
- Advanced Graphics / VLSI Design Instructional Laboratory
- Pittsburgh Integrated Circuits Analysis (PICA) Research Laboratory
- Optical Computing Research Laboratory
- Neural Network Simulation Research Laboratory
- Undergraduate Signal Processing Instructional Laboratory

STUDENT SUPERVISIONPh.D. Dissertations Supervised

Samuel J. Dickerson, Ph.D. “Dielectrophoresis Based Methods for Separating Particles on Lab-On-Chip Platforms”, Electrical and Computer Engineering, University of Pittsburgh, December 2012 (Co-Chair with D. Chiarulli) (*Nanophoretics*).

José A. Martínez, Ph.D. “Model Order Reduction of Nonlinear Dynamic Systems Using Multiple Projection Bases and Optimized State-Space Sampling,” Electrical Engineering, University of Pittsburgh, April 2009 (*Cadence Design Systems*).

Majd F. Sakr, Ph.D. “Analysis, Optimization and Execution of General Purpose Multimedia Applications on Subword VLIW Datapaths,” Electrical Engineering, University of Pittsburgh, November 2003 (Co-Chair with D. Chiarulli) (*Carnegie Mellon University, Qatar*).

Timothy P Kurzweg, Ph.D. “Optical Propagation Methods for System-Level Modeling of Optical MEM Systems,” Electrical Engineering, University of Pittsburgh, August 2002 (*Drexel University*).

Yee-Wing Hsieh, Ph.D. “Model Abstraction via Semantic Extraction of Behavioral VHDL Descriptions for Formal Verification,” Electrical Engineering, University of Pittsburgh, May 2000 (*Cadence Design Systems*).

Naruemon Wattanapongsakorn, Ph.D. “Integrating Dependability Analysis and Optimization into Distributed Embedded System Design Process,” Electrical Engineering, University of Pittsburgh, July 2000 (*King Mongkut’s University of Technology, Thonburi, Thailand*).

Yousef Al-Houmaily, Ph.D. “Commit Processing in Distributed Database Systems and in Heterogeneous Multidatabase Systems,” Electrical Engineering, University of Pittsburgh, May 1997 (Co-chair with Panos Chrysanthos) (*Institute of Public Administration, Saudi Arabia*).

Stephen T. Frezza, Ph.D. “Requirements Based Design Evaluation,” Electrical Engineering, University of Pittsburgh, October 1995 (*Gannon University*).

Kyumyung Choi, Ph.D. “A Robust Architectural Synthesis Method for Realistic System Design,” Electrical Engineering, University of Pittsburgh, September 1995 (*Samsung, Korea*).

Alan R. Martello, Ph.D. “Temporal Analysis for Time-Bounded Causal Digital Systems,” Electrical Engineering, University of Pittsburgh, May 1993 (*Consultant*).

M.S. Theses Supervised

- John A. Carpenter**, M.S., "Image Processing Pipeline Based on Coupled Oscillator Models," Computer Engineering Program, Dietrich School of Engineering, University of Pittsburgh, December 2013 (co-chair with D. Chiarulli). (*Omnyx LLC, Pittsburgh*).
- Yan Fang**, M.S. "Hierarchical Associative Memory Based on Oscillatory Neural Networks," Electrical and Computer Engineering, University of Pittsburgh, April 2013 (*University of Pittsburgh, Ph.D. program*).
- Joseph Jezak**, M.S. "Accelerated Signal Processing Algorithms for the Cell Broadband Engine," Computer Engineering Program, University of Pittsburgh, April 2012 (Co-Chair with D. Chiarulli) (*University of Pittsburgh, Ph.D. program*).
- Jeffery S. Vance**, M.S. "Application of Bayesian Networks to Coverage Directed Test Generation for the Verification of Digital Hardware Designs," Electrical and Computer Engineering, University of Pittsburgh, April 2010 (*Westinghouse Electric Company*).
- Samuel J. Dickerson**, M.S. "Design of a Lab-on-Chip for Manipulating and Detecting Nanometer Scale Particles using 3D Integrated Circuit Technology," Electrical and Computer Engineering, University of Pittsburgh, August 2007 (Co-chair with D. Chiarulli) (*University of Pittsburgh, Ph.D. program*).
- Joel R. Martin**, M.S. "Characterization of Multi-Bit Differential Channels: A Modified Modal Scattering Parameter Approach," Electrical and Computer Engineering, University of Pittsburgh, August 2006 (Co-chair with D. Chiarulli) (*National Security Agency*).
- David Reed**, M.S. "A Co-Simulation Environment for Mixed Signal, Multi-Domain System Level Design Exploration," Electrical and Computer Engineering, University of Pittsburgh, August 2004 (*Keynote Systems Inc.*).
- Amit Gupta**, M.S. "Investigation of High-Speed Optoelectronic Receivers in Silicon Germanium ($\text{Si}_{1-x}\text{Ge}_x$)," Electrical Engineering, University of Pittsburgh, December 2003 (*IBM*).
- Jose A. Martinez**, M.S. "Piecewise Linear Simulation of Optoelectronic Devices with Application to MEMS," Electrical Engineering, University of Pittsburgh, June 2000 (*University of Pittsburgh, Ph.D. program*).
- Timothy P. Kurzweg**, M.S. "A CAD System for Simulating Free Space Opto-Electronic Systems," Electrical Engineering, University of Pittsburgh, October 1997 (*University of Pittsburgh, Ph.D. program*).
- Mark A. Rempel**, M.S. "Abstract Timing Simulation for Combinational Circuits Represented in VHDL Using the Bounded Delay Model," Electrical Engineering, University of Pittsburgh, May 1996.
- Craig M. Valine**, M.S. "A New Data Acquisition System for the Cryogenic Magnetic Detector at the VEPP-2M Collider," Electrical Engineering, University of Pittsburgh, August 1995.
- James Teza**, M.S. "The Design of a Multiprocessor Architecture Using a Partitioned Optical Passive Star Interconnection Network," Electrical Engineering, University of Pittsburgh, April 1995.
- Majd Sakr**, M.S. "Predicting Multiprocessor Communication Patterns with Neural Networks," Electrical Engineering, University of Pittsburgh, April 1995 (Co-chair with D. Chiarulli) (*University of Pittsburgh Ph.D. program*).
- Paul A. Kwan**, M.S. "Analog/Digital VLSI Implementation of Hippocampus," Electrical Engineering, University of Pittsburgh, May 1993.
- Yee-Wing Hsieh**, M.S. "Architectural Synthesis via VHDL," Electrical Engineering, University of Pittsburgh, December 1992 (*University of Pittsburgh Ph.D. program*).

- Manoj M. Bidnurkar**, M.S. "Erbium Doped Fiber Amplifiers and Optical Buses," Electrical Engineering, University of Pittsburgh, October 1992.
- Thomas B. George**, M.S. "A Multi-Level Logic Simulator for MOS Digital Circuits Specified in VHDL," Electrical Engineering, University of Pittsburgh, July 1991.
- David S. George**, M.S. "Synthesis of Asynchronous Sequential Logic in the Spatial and Temporal Domains," Electrical Engineering, University of Pittsburgh, July 1991.
- Jacqueline Solomon**, M.S. "A Transputer Based System for the Simulation of Multi-Node, Nonlinear Systems Applied to the Study of the Hippocampal Formation," Electrical Engineering, University of Pittsburgh, May 1991 (co-chair with R. ScLabassi).
- Stephen T. Frezza**, M.S. "SPAR: A System for the Automatic Generation of Schematic Diagrams," Electrical Engineering, University of Pittsburgh, April 1991 (*University of Pittsburgh, Ph.D. program*).
- Melanie D. Berg**, M.S. "Error Bounding Parallel Simulated Annealing on a Hypercube," Electrical Engineering, University of Pittsburgh, January 1991.
- Saverio Fazzari**, M.S. "FATE: A Fault Simulator and Test Pattern Generator for VHDL," Electrical Engineering, University of Pittsburgh, August 1990.
- Jeffrey Marquis**, M.S. "A Microprogrammable Control Unit for the Image Understanding Architecture," Electrical Engineering, University of Pittsburgh, August 1989.
- Kenneth Moore**, M.S. "VLSI Resistance Extraction: A Multi-algorithmic Approach," Electrical Engineering, University of Pittsburgh, April 1989. (**Best M.S. Thesis** - Department of Electrical Engineering, 1989)
- Robert Swarner**, M.S. "Unix Security Issues," Electrical Engineering, University of Pittsburgh, December 1988.
- Lyn Ann Mears**, M.S. "Tickle: An Integrated Design Capture and Simulation Tool," Electrical Engineering, University of Pittsburgh, August 1988.
- Leonidas Fegaras**, M.S. "Constructive Placement for VLSI Systems Using Slicing Structures," Electrical and Computer Engineering, University of Massachusetts, February 1987.

M.S. Projects Supervised

- Jeffrey Brinkhus**, Radar Front-End Signal Processing on a FPGA Platform, 12/12.
- Arnaldo Noyola**, High Speed Distributed Amplifiers in SiGe, 8/08 (*Raytheon*).
- Jason Boles**, General Purpose Computing on Special Purpose Hardware, 12/05 (*University of Pittsburgh*).
- Michael Bails**, Modeling and Simulation of Optical MEMS, 7/05 (*FedEx*).
- Jeremiah Cessna**, Design of Low Noise Sensor Integrated Circuit, 4/02 (*Cadence Design Systems*).
- Eric Reiss**, 3D GUI for Optical Micro-Electro-Mechanical Design, 4/01 (*University of Pittsburgh*).
- Amirthavalli Kasturi**, Associative Memory Architectures, 4/00 (*Consultant*).
- Chi-Ti Hsieh**, Micro-Electro-Mechanical Systems Modeling, 12/99 (*Georgia Tech Ph.D. program*).
- Ananathakrishnan Ramamurti**, Dynamic Allocation & Scheduling for Super Scalar ALU, 4/98.
- Jennifer Smith**, CEMore: A CEBus Communications Monitor, 3/98.
- Raju Menon**, Optoelectronic Super Scalar ALU, 8/97.
- Madhulima Pandey**, Spectral Reed-Solomon Coding for Optical Memories, 7/97.

B.S. Honors Theses Supervised

John P. Elliott, B.S. “Sced: An Icon Based Schematic Editor,” Electrical Engineering, University of Pittsburgh (Honors College), April 1988.

Undergraduate Research Supervision

Nicholas Mollers (2014-2015), Reggie Barnett (2014), Soyo Awosika-Olumo (EXCEL Summer Research Intern) (2013-2014), Natalie Janosik (2013-2015), Andrew Seel (2013-2014), Chet Gnegy (2011-2013), Alexander Schaefer (2010-2012), Don Virostek (2012), Jacob Freet (2012), Joe Landry (2012), Michelle Rosen (EXCEL Summer Research Intern) (2011), Ingrid Avendano (Dean’s Summer Internship) (2011), Michael Nayhouse (2009-2010), Jeffrey Brinkhus (CoE Summer Internship) (2010), Emily Smith (NSF-REU), Ben Slavin (Mascaro Sustainability Initiative), Brandon Redding (NSF-REU), Hu Shichao (IAESTE 2004), Sean Kluse (unfunded), Abhijit Davare (NSF-REU), Ethan Jackson (NSF-REU), Michael Hutchinson (NSF-REU), Ludwig Salomon (NSF-REU), Rajon Gilmore (NSF-REU), Charles Hasek (NSF-REU), Shameka Osborne (NSF-REU), Kurt Prough (NSF-REU), Michael Shomsky (NSF-REU).

Current Graduate Student Supervision

I am directly supervising the research of the following Electrical and Computer Engineering and Computer Engineering Graduate Students:

Joseph Jezak - Ph.D. Computer Engineering (Parallel Processing) (with D.M.Chiarulli)

Yan Fang - Ph.D. Electrical and Computer Engineering (Neuromorphic Computing)

Brandon Jennings - M.S. Electrical and Computer Engineering (Oscillator Based Image Processing Architectures)

Student Committees**University of Pittsburgh:**

Department of Electrical and Computer Engineering: (Ph.D.): Ron Valli, Chu Ming Huang, Zicheng Guo, Moumir Hamdi, Fred Esenwein, Mohammed A. Saleh, Michael P. Casey, Don Geilosh, Yabo Li, Yu-Te Wu, Cheng Chung Li, Dong-Sun Min, Theodore Manikas, Ying Yu, Baris Taskin, Robert Murawski, Peter Hawrylak, Charles Jewart, Ralph Sprang, Ramana Vinjamuri, Yi Xu, Zhanpeng Jin, Xiuyi Zhou, Michel Hanna (CoE), Ping Zhou (CoE), Lin Li, Vyasa Sai (CoE), Lei Jiang (CoE), Yicheng Bai, Yi Xu, Bo Zhao (CoE), Xiuyuan Bi, Rujia Wang, Jiwei Liu; **(M.S.):** Peiyuan Wang, Ikso Pai, Y.T. Wu, Jiyong Ahn, Jeffrey J. Freiwald, Mahesh Bandi, Baris Taskin, Rajani Parthasarathy, Dara Kusic, Kshitij Gupta, Tim Carey, Charles Jewart, Jeffrey Schuster, Wei-Ting Johnny Ng, Gerold Dhanabalan, Colin Ihrig (CoE), Yu Zhang, Kingsley Adeoye, Michel Hanna (CoE), Yuwen Sun, Vyasa Sai (CoE), Bo Zhao (CoE), Ismail Bayram, Yirong Zhao, Alexander Schaefer, Enes Eken, Nathan Altay Hunter, David Dgien, Rujia Wang.

Computer Science: (Ph.D.): S. Venkatesan, M. Sultan Alam, Ravi Sharma, Chunming Qiao, Tia (Marcia) Watts, J. Plusquellic, Leo Selavo, Jason Bakos.

Physics & Astronomy: (Ph.D.): Ed Lauzier, Alex Sher, Arie Baratt, **School of Library Information Science: (Ph.D.):** Muh-rong Yang.

Civil and Environmental Engineering: (Ph.D.): A. Eljadei.

University of Massachusetts (Ph.D.): Deepak Rana, Brian Burns, Alfred Hough, Earl Billingsley; (M.S.) John Motolla.

Pennsylvania State University: (Ph.D.): Pao-Po Hou, William Bralick, Matthew Cotter.

Carnegie Mellon University: (Ph.D.) Brian Telfer, Sanjay Natarajan, John-Scott Smokelin, Anand Iyer, Leonard Neiberg, John Eppling.

Heriot Watt University: (Ph.D.): Rafael Gil Otero (External Examiner, May 9, 2008).

PROFESSIONAL SERVICE

Professional, Technical Society, and Conference Committees

Scientific Committee, Cellular Neural Networks and Architectures Conference (CNNA) 2014

Organizer, Special Session “Oscillator Based Computing”, 51st DAC 2014

Search Committee, ACM/TODAES Editor in Chief: 2013-2014

Session Chair, ITRS Workshop on Fundamental Concepts in Emerging Research Architectures: December, 2012

Best Paper Review Committee, 48th DAC 2011

Past Chair, 45th Design Automation Conference: 2007-2008

Chair, SIGDA History Committee: 2008-

Search Committee, ACM/TODAES Editor in Chief: 2008

General Co-Chair, Workshop on Biochips to Interface and Monitor Human Biological Functions, June, 2008

General Co-Chair, IEEE/ACM International Workshop on Design and Test of Defect-Tolerant Nanoscale Architectures (NANOARCH’08), June, 2008

General Chair, 44th Design Automation Conference: 2006-2007

Vice and Finance Chair, 43rd Design Automation Conference: 2005-2006

Executive Committee, Design Automation Conference: 1998-2008

Executive Committee, Electronic Design Process Symposium (EDPS): 2007

Steering Committee Member, ASP-DAC: Asia and South Pacific Design Automation Conference (DAC Representative): 2006

Member, Richard A. Newton DAC Graduate Scholarship Committee: 2006-2010

Standing Committees Chair, IEEE CS Nano Task Force: 2005-

Organizer, DAC Student Design Contest: 2000-2004

Chair, ACM/SIGDA: ACM Special Interest Group on Design Automation, 1997-2001

Member, SIGDA Board: ACM Special Interest Group on Design Automation July, 1991-2005

Publicity Chair and Program Committee, IEEE International Workshop on Design and Test of Defect-Tolerant Nanoscale Architectures (NANOARCH’06), June, 2006

Special Session Chair, IEEE International Workshop on Design and Test of Defect-Tolerant Nanoscale Architectures (NANOARCH’05), May, 2005

Program Committee, SPIE, Optical Modeling and Performance Predictions VII, August 2015

Program Committee, SPIE OP307, Optical Modeling and Performance Predictions VI, August 2013

Program Committee, SPIE 8127, Optical Modeling and Performance Predictions V, August 2011

Program Committee, IEEE/ACM International Symposium on Nanoscale Architectures (NANOARCH ’09), July 30-31, 2009

Program Committee, SPIE 7427, Optical Modeling and Performance Predictions IV, August 2009

Program Committee, SPIE 6675, Optical Modeling and Performance Predictions III, August 2007

Program Committee, Annual Santa Fe Workshop on Interconnections within High Speed Digital Systems (HSD), 2005-2006

Program Committee, SPIE 5867, Optical Components and Systems Engineering, August 2005

Program Committee, SPIE 5178, Optical Modeling and Performance Predictions, August 2003

Program Committee, IEEE 2003-2005 International Conference on Microelectronic Systems Education

Program Committee, Design Test Integration and Packaging of MEMS/MOEMS, May 2002, May 2003

Program Committee, SPIE 4455 Micro- and Nano-optics for Optical Interconnect, July 2001

Program Co-Chair, Design Test Integration and Packaging of MEMS/MOEMS, April 2001

Program Committee, IEEE LEOS Annual Meeting, November 2000

Program Committee, IEEE LEOS Workshop on High Speed Interconnect, May 2000

Program Committee, OC'99: OSA, Topical Meeting on Optics in Computing, April 1999

Organizing Committee, FIE'97: IEEE/ASEE Frontiers in Education, November 5-8, 1997

Program Committee: Massively Parallel Processing Architectures Using Optical Interconnect, April 1994, October 1995

Program Chair, IEEE VLSI-TC Winter Workshop: April 27-30, 1994

Program Committee, VIUF: VHDL International Users Forum, May 1-4, 1994

Program Committee, Fifth ISSM International Conference on Parallel and Distributed Computing Systems, 1992

Program Committee, 25th Annual Simulation Symposium, 1992

University Booth Coordinator, Design Automation Conference, June 1992

Local Arrangements Chair, PDW: Third Physical Design Workshop, May 20-23, 1991

Publicity Chair, ISCA: 15th International Symposium on Computer Architecture, 1988

Session Chair: 19th Annual Pittsburgh Conference on Modeling and Simulation, 1987

Editorial Service

Associate Editor, TODAES: ACM Trans. on Design Automation of Electronic Systems, 1995-2005

Steering Committee Member, TVLSI: IEEE Transactions on VLSI Systems, 1997-2004

Associate Editor, TVLSI: IEEE Transactions on VLSI Systems, 1995-1997

Guest Editor, Applied Optics: CAD for Optoelectronic Systems, September 1998

Editor, SIGDA Newsletter: ACM Special Interest Group on Design Automation, 1994-1997

Advisory Boards

The Technology Collaborative (formerly Pittsburgh Digital Greenhouse) Technical Advisory Board 1999-2012

Pittsburgh Public School (PPS) District's Career and Technical Education (CTE) Pre-Engineering Occupational Advisory Committee of the Pittsburgh Science & Technology Academy 2010 -

Department, School and University Committee Assignments

Chair, Computer Area, Electrical and Computer Engineering 2009-
Co-Chair, Computer Engineering Graduate Program, 2006-
 Swanson School of Engineering Appointment, Promotion and Tenure Committee, 2010-
Interim Co-Chair, Computer Engineering Undergraduate Program, 2010-2011
Chair, Electrical and Computer Engineering Faculty Search Committee, 2008-2009;
 2009-2010; 2010-2011
 Swanson School of Engineering Academic Affairs Committee, 2010-2011
 Electrical and Computer Engineering Executive and Planning Committee, 2009-
 Advisory Board, Pittsburgh Science & Technology Academy, Engineering Track, 2009-
 2010

Graduate Coordinator, Electrical and Computer Engineering, 2004-2006
 Electrical and Computer Engineering Chair Search Committee, 2004-2005
 Electrical and Computer Engineering Planning Committee, 2003-2006
 Electrical and Computer Engineering Graduate Recruiting Committee, 2003-2006
 School of Engineering Appointment, Promotion and Tenure Committee, 2003-2006
 Electrical Engineering Faculty Search Committee, Chair 1998-1999, 1999-2000, 01-02
 School of Engineering Laboratory Committee, 1997-1998
 Computer Engineering Laboratory Committee, 1997-1999
 Provost Ad hoc Committee to Establish a University Email Policy, 1997-1998
 School of Engineering Planning and Budget Committee, 1996-1998
 Electrical Engineering Planning and Budget Committee, 1995-1996
 School of Engineering Ad-Hoc Committee for Computer Engineering, 1995-1996
 School of Engineering Promotion and Tenure Committee, 1994-1996
 School of Engineering Computer Allocation and Technology Committee, 1993-
 School of Engineering representative to Software Engineering Institute, 1993-
 FAS Internal Review Committee: Evaluation of the Intelligent Systems Program, 1993
 FAIS (Computer Usage) Administrator, 1993-2000
 Engineering Honors College Advisory Committee, 1992-1993
 School of Engineering Freshman Mentor, 1992-2005
 Joint EE-CS Computer Engineering Planning Committee, 1990
 Electrical Engineering Undergraduate Curriculum Committee, 1990, 1994
 Department of Computer Science Institute for Parallel and Distributed Systems (IPDIS)

Professional Society Memberships

Fellow (2015), Senior Member (1995), IEEE; Circuits and Systems Society (CASS),
 Computer Society (CS), Laser and Electro-Optics Society (LEOS).
 Association for Computing Machinery (ACM), Special Interest Group on Design
 Automation (SIGDA), Special Interest Group on Computer Architecture
 (SIGARCH).
 Optical Society of America (OSA).
 Society of Photo-Optical Instrumentation Engineers (SPIE).
 Sigma Xi.
 Engineers Without Borders.

Reviewed for:

National Institute of Science and Technology (NIST): U.S.-Israel Binational Industrial Research and Development (BIRD) Foundation

Scientific Reports (Nature)

ACM Journal on Emerging Technologies in Computing Systems (JETC)

Grand Awards Judge for Intel International Science and Engineering Fair (ISEF)

The ACS Cycle of Excellence

Journal on Analog Integrated Circuits and Signal Processing

OSA Applied Optics

ACM Transactions on Design Automation of Electronic Systems

IEEE Journal of Exploratory Solid-State Computational Devices and Circuits

IEEE Transactions on Biomedical Circuits and Systems

IEEE Computer

IEEE Transactions on VLSI

IEEE Transactions on Computers

IEEE Journal of Solid State Circuits

Journal of Parallel and Distributed Computing

Proceedings of the IEEE

University Video Communications

Kluwer Academic Publishers

Prentice Hall Publishers

International Conference on Parallel Processing

International Symposium on Computer Architecture

Ben Franklin Pennsylvania Challenge Grant Evaluation

Air Force Office of Scientific Research

National Science Foundation:

Computing and Communications Foundations review panel 03/15

Computing and Communications Foundations review panel 05/14

Computing and Communications Foundations review panel 11/12

Computing and Communications Foundations review panel 3/12

Software-Hardware Foundations review panel 12/10

Design Automation/Software-Hardware Foundations review panel 3/09

SBIR/STTR Phase I SS: Media Applications review panel 2/09

SRC MCDA (Multicore Chip Design and Architecture) review panel 12/4-5/08

DA/SLD (Design Automation/System Level Design) review panel 1/11-12/07

Division of Computing & Communication Foundations (CCF) 5/04

Committee of Visitors (CISE/EIA Research Instrumentation Program) 4/27-28/99

C-CR (Computer - Communication Research) individual and panels

CCR (Computer and Computation Research) individual and panels

MIPS (Microsystems Information Processing Systems) (DTT) review panel 3/5/99

CAREER (CISE/MIPS) review panel 1/8/97

ERC (site review of Colorado Opto-electronics Center) 4/89, 4/91

RIA (Research Initiation Awards proposal review panel) 3/23/89, 3/26/93, 3/15/94

SBIR (Small Business Innovative Research) review panel 9/14/90, 9/20/91, 9/3/92, 9/14/06

CRI (CISE Research Instrumentation) 12/5/91

ILI (EHR/USEME Instrumentation and Laboratory Improvement) 1/22/92-1/25/92

Professional Development

CRA-CCC Workshops on Extreme Scale Design Automation (ESDA). Participated in all of the series of three workshops identifying critical directions for electronic design automation in support of extreme scale design: March 7-8, 2013, Pittsburgh PA; June, 2-3, 2013, Austin, TX; and February 21-22, 2014, Tampa, FL.

Pathways to Innovation Program (participant and team leader). Team Planning Workshop, Phoenix, AZ, February 26-28, 2014. Funded by the National Center for Engineering Pathways to Innovation (EPIcenter), Stanford University, NCIIA, and NSF.

Young Faculty Workshop (organizer), 49th Design Automation Conference, San Francisco, CA, June 2012. Sponsored by NSF, SRC, SIGDA, DAC, and CEDA.

CRA-W/CDC Workshop on Diversity in Design Automation and Test, University of Pittsburgh, Pittsburgh, PA, May 23, 2011.

National Science Foundation (NSF) Broader Impacts for Research and Discovery Summit (BIRDS), Washington, D.C., June 21-23, 2010. Sponsored by NSF CISE.

Young Faculty Workshop (organizer), 46th Design Automation Conference, San Francisco, CA, July 2009. Sponsored by NSF, SRC, SIGDA, DAC, and CEDA.

3rd ACM/SIGDA Design Automation Summer School (DASS) (organizer), 44th Design Automation Conference, San Diego, CA, June 2007. Sponsored by NSF, SIGDA, and DAC.

2nd ACM/SIGDA Design Automation Summer School (DASS) (organizer), 42nd Design Automation Conference, Anaheim, CA, June 2005. Two day intensive course on recent research in design automation (DA) comprised of instruction on several research areas by a dozen well-established researchers. Sponsored by NSF, SRC, and SIGDA.

Workshop on Teaching Verification (organizer), 39th Design Automation Conference, New Orleans, LA, June 2002. One-day course in tools and instructional material for faculty teaching courses on verification of digital systems.

Structural Level Systems on a Chip Design (instructor), One-week intensive course for continuing education in SoC methodologies including behavioral modeling, test plan development, behavioral synthesis, decomposition and RTL synthesis, integration, testing and productization of silicon IP.

Workshop for VLSI Design Educators (organizer), 37th Design Automation Conference, Los Angeles CA, June 2000. One day course in tools, and instructional material for faculty teaching full custom VLSI Design courses.

AT&T ARPA FET/SEED Workshop, AT&T, Newark, NJ, June 1993. An intensive three-day course in the design and fabrication of self electro-optic devices (SEED) and smart pixels.

Speed Reading Course, University of Pittsburgh Learning Skills Center, January 22-31, 1991.

GaAs IC Digital Design Teachers' Course, University of California, Santa Barbara, July 1989. A ten-day course for university professors who had been teaching NMOS and CMOS VLSI courses to give them the tools to teach design using GaAs.

MOSIS CMOS-VLSI Teachers' Course, MOSIS/ISI, July 1985. An intensive ten day course for university professors who had been teaching NMOS VLSI design courses to introduce them to the tools and techniques available and to interact with the MOSIS fabrication service.