

CURRICULUM VITAE

VICTOR P. NELSON, Ph.D., P.E.

Professor, Electrical & Computer Engineering

UNDERGRADUATE AND GRADUATE EDUCATION:

BSEE, 1971, University of Kentucky (Electrical Engineering)
MS, 1977, Ohio State University (Electrical Engineering)
Ph.D., 1978, Ohio State University (Electrical Engineering)

EXPERIENCE:

1972-1975: Instructor at the U.S. Naval Nuclear Power School, Bainbridge, Maryland.

1976-1978: Research Assistant with the Communication and Control Systems Lab of The Ohio State University.

1978-Present: Faculty member in Department of Electrical & Computer Engineering, Auburn University

Initial Appointment: Assistant Professor, December 1978

Appointment to Graduate Faculty: June 1981.

Promotion to Associate Professor: Fall 1982.

Promotion to Professor, Fall 2003

Granted Tenure: September 1983.

Interim Associate Dean for Assessment and the Freshman

Computing Initiative: September 1999 - August 2000.

PROFESSIONAL ORGANIZATIONS, HONORS, AND AWARDS:

Memberships:

- Registered Professional Engineer (Alabama)
- IEEE Computer Society (Senior Member)
- Association for Computing Machinery
- American Society for Engineering Education
- Eta Kappa Nu
- Pi Mu Epsilon

Awards:

- Walker Merit Teaching Award, College of Engineering, 2002.
- Birdsong Merit Teaching Award, College of Engineering, 2000.
- Auburn University faculty honoree - "Camp War Eagle", 1995.
- ASPE Regional Young Engineer of the Year, 1984
- Honorable mention - C. Holmes Macdonald Outstanding Teaching Award for Young Electrical Engineering Professors, Fall 1983.
- NCAA Post-Graduate Scholarship winner, 1971.

Research Grants:

- "Wafer-Oriented Trend Analysis for VLSI Test Optimization", with Adit D. Singh, National Science Foundation, NSF-CCR-9912389, \$315,117, September 1, 2000 - August 31, 2003.
- "NOTES (Novel Test Strategies)", U.S. - Spain Science and Technology Program Joint Research Project, with A.D. Singh (Auburn) and J. Figueras (Universitat Politecnica De Catalunya). \$25,670, June 1, 1999 - May 31, 2000.
- "An Integrated Model for Evaluating Test Effort, Product Quality and Cost Trade-off in Microelectronics Manufacturing", Co-principal investigator with A.D. Singh and R.W. Johnson, DARPA, \$529,764, March 1995-March 1997.
- "Fault Tolerance and Architectural Reliability of Distributed Processing Systems" by the U.S. Army Ballistic Missile Defense Advanced Technology Center. Six separate awards from July 1979 through September 1986. Total amount: \$648,000.
- "Reconfigurable, Distributed Digital Filters" by the Auburn Engineering Experiment Station" Award: \$14,020, October 1979 to September 1980.
- "Hardware Upgrade to a Fault Tolerance Distributed Computing Laboratory" by the U.S. Army Research Office, Award: \$174,085, June 1982 to May 1985.
- "Microcomputer Control of a Home Appliance Network" by Whirlpool Corporation. Four Awards from September, 1983 through December 1987. Total amount: \$321,065.
- "Parallel Logic Simulation and Fault Analysis of Digital Circuits" by Cray Research, Inc., Award: \$19,503, January 1988 to December 1988.

Instructional Support Grants:

- "A VLSI Computer-Aided Design Laboratory - Equipment Support", National Science Foundation, \$99,510, March 1990 to August 1991.
- Arranged donation of approximately \$6 million of computer-aided design software from Mentor Graphics, Xilinx, and Altera.
- Arranged donation of approximately \$1.2 million of computer-aided design software from Intergraph/Dazix.

PRINCIPAL CONTRIBUTIONS IN AREA OF SPECIALIZATION:

Courses Taught:

CSE220 - Fundamentals of Structured Programming *
EE306 - EE Lab VI (Computer-Controlled Motor) *
EE3050 - Computer System Design Lab *
EE330/221 - Design and Analysis of Logic Circuits
EE335/222 - Computer Org. and Assy. Lang. Prog.
EE401/402,ELEC4000 - Senior Design Projects
EE4200 - Digital Systems Design *
EE430 - Introduction to Microprocessor Systems
EE520 - Introduction to Computer Graphics **
EE521 - Artificial Intelligence and Robotics **
EE523 - Fault Diagnosis of Digital Systems
EE523/6250 - Computer-Aided Digital Circuit Design *
EE524/6210 - Personal Computer Hardware Design *
EE525 - Microcomputer Laboratory *
EE527 - Systems Programming
EE528 - Compiler Design
EE530 - Computer Engineering Seminar
EE530/CSE530/6200 - Computer Architecture and Design *
EE531/CSE531 - Bit-Slice, Microprogrammed CPU Design
EE590/ELEC6260 - Embedded Computing Systems *
EE590 - Introduction to Multiprocessor Systems *
EE621 - Switching Theory I
EE626/CSE626 - Computer Architecture I
EE633/CSE633 - Special Purpose Computer Systems
EE636/CSE636 - Computer Networks **
EE642/CSE642 - Fault Tolerant Computing **
EE576/677/678/776 - VLSI Design I & II *
ELEC7970 - Standard Cell IC Design *
EE690 - 32-Bit Microprocessors *
* - new courses developed, ** - old courses redesigned

Contributions to Curriculum Development and Administration:

- Chair, ECE Curriculum Committee
- Member, ECE Executive Committee
- Developed proposals for Bachelor of Computer Engineering and Bachelor of Wireless Engineering programs at Auburn
- Member, College of Engineering Curriculum Committee
- Member, College of Engineering ABET EC-2000 Committee
- ABET Program Evaluator
- IEEE Computer Society "Computing Curricula 2001" (CC2001) Committee - Computer Engineering Model Curriculum Member
- Served on the Computer Science and Engineering Curriculum Committee; initial chairman of the committee.
- Interim Associate Dean for Assessment and the Freshman Computing Initiative (1999-2000).
- Coordinator, ECE Department SACS/ABET accreditation activities
- Director, ECE Digital Stem (since 1979)
- Established VLSI Computer-Aided Design and Test Laboratory

- ECE Graduate Program Coordinator (January 1994-present)
- Directed 32 completed Master's Theses and 6 PhD dissertations
- Currently directing one M.S. student and a member of 16 graduate student advisory committees

MAJOR PUBLICATIONS

TEXTBOOKS AND BOOK CHAPTERS:

- Digital Logic Circuit Analysis & Design, V.P. Nelson, H.T. Nagle, B.D. Carroll, and J.D. Irwin. Prentice-Hall, Inc., Englewood Cliffs, NJ, 1995.
- "Computer Architecture", V.P. Nelson, Chapter 3, The Handbook on Industrial Electronics, J. David Irwin, editor, pp. 48-72, CRC Press, 1997.
- "MCM Testing", V.P. Nelson, Chapter 15, Handbook of Multichip Module Technology, ISHM, P Garrou & I Turlik, eds., pp. 15.1-57.
- "Techniques in Fault-Tolerant Computing", Control and Dynamic Systems, Vol. 60, C.T. Leondes, Editor, Academic Press, 1994, pp. 329-365.
- Fault Tolerant Computing, V.P. Nelson & B.D. Carroll, IEEE Computer Society Press, 1987.
- 74AS-EVM-16 Microprogramming ASISP Processors, Laboratory Manual No. 1, Texas Instruments, Inc., 1987.

JOURNAL PAPERS:

- Knight, C.G., Singh, A.D., and V.P. Nelson, "An IDDQ Sensor for Concurrent Timing Error Detection", IEEE Journal of Solid State Circuits, Vol. 33, No. 10, October 1998, pp. 1545-1550.
- Wang, C.J., Wu, C., and V.P. Nelson, "A Study of the Generalized Multiple Bus-Connected Parallel Computer", The Computer Journal, Vol. 35, 1992, pp. A089-A094.
- Kutz, L.J. and V.P. Nelson, "Remote Control of a Robot in a MAP Network", International Journal of Advanced Manufacturing Technology, Vol. 6, 1991, pp.317-327, Springer-Verlag London, Ltd.
- Wang, C.J. and V.P. Nelson, "Petri Net Performance Modelling of a Modified Mesh-Connected Parallel Computer", Parallel Computing, Vol. 17, pp. 75-84, 1991.
- Nelson, V.P., "Fault Tolerant Computing: Fundamental Concepts", IEEE Computer, Vol. 23, No. 7, pp 19-25, July 1990. Also included in Readings in Ultra-Dependable Distributed Systems, by N. Suri, C.J. Walker, and M.M. Hugue, from IEEE Computer Society Press.
- Wang, C.J., Wu, C.H., and V.P. Nelson, "A Comparative Architectural Study of Three MIMD Computing Surfaces", IEE

- Proceedings, Vol. 137, Pt. E, No. 4, pp. 261-268, July 1990.
- Bisbee, C.R. III, and V.P. Nelson, "Failure dependent bandwidth in shuffle/exchange networks", IEEE Transactions on Computers, Vol. C-37, No. 7, July 1988, pp 853-858.
 - Thanawastien, S. and V.P. Nelson "Interference analysis of shuffle/exchange networks", IEEE Transactions on Computers, Vol. C-30, No. 8, Aug. 1981, pp 545-555.
 - Nelson, V.P. and Fellows, H.L., Jr., "A microprocessor-based real-time amusement ride controller", IEEE Micro, Vol. 1, No. 3, August 1981, pp 13-22. Also included in Microprocessors & Microcomputers, J.T. Cain, Ed., IEEE Computer Society Press, 1984, pp. 327-336.
 - Nagle, H.T., Jr. and V.P. Nelson "Implementing digital filters on 16-bit microcomputers", IEEE MICRO, Vol. 1, No. 1, Feb. 1981, pp 23-41.
 - Nelson, V.P. and H.T. Nagle, Jr. "Comparison of 16-bit microcomputer performances in digital filtering applications", IEEE MICRO, Vol. 1, No. 1, Feb. 1981, pp 32-40.
 - West, G.L., Nagle, H.T., Jr. and V.P. Nelson "A microcomputer-controlled testing system for digital integrated circuits", IEEE Transactions on Industrial Electronics and Control Instrumentation, Vol. IECI-27, No. 4, Nov. 1980, pp 279-283.
 - Bray, J.M., Nelson, V.P., deMaine, P.A.D. and Irwin, J.D., "Data- Compression Techniques Ease Storage Problems", Computer Design, Vol. 24, No. 14, Oct. 15, 1985, pp. 102-106.

CONFERENCE PAPERS:

- Victor P. Nelson, Mitchell D. Theys, Alan Clements, "Computer Architecture and Organization in the Model Computer Engineering Curriculum", accepted for publication at FIE-2003, Boulder, Colorado, November, 2003.
- Victor P. Nelson, Richard O. Chapman, Richard C. Jaeger, "A New Baccalaureate Program in Wireless Engineering", Proc. ASEE Annual Conference and Exposition, June 22-25, Nashville, TN, Paper 2127.
- Joseph L. Hughes, Pradip Srimani, Victor P. Nelson, "Computing Curricula 2001: Computer Engineering", 2002 ASEE Annual Conference and Exposition, Montreal, Quebec, Canada, June 16-19, 2002.
- Thomas S. Barnett, Adit D. Singh, Victor P. Nelson, "Estimating Burn-In Fall-Out for Redundant Memory", accepted for presentation at International Test Conference, Oct. 28-Nov 2, 2001, Baltimore, MD.
- Thomas S. Barnett, Adit D. Singh, Victor P. Nelson, "Yield-Reliability Modeling for Fault Tolerant Integrated Circuits", accepted for presentation at Defect and Fault Tolerance in VLSI", 2001.
- Thaddeus Roppel and Victor P. Nelson, "Web-Enhanced Instruction and Assessment for a First Course in Electrical

and Computer Engineering", 2001 ASEE Annual Conf. & Exposition, June 24-27, Albuquerque, NM.

- Thomas S. Barnett, Adit D. Singh, Victor P. Nelson, "Burn-In failures and Local Region Yield; An Integrated Yield/Reliability Model", VLSI Test Symposium, Marina del Rey, CA, May 2001.
- Knight, C.G., Singh, A.D., and V.P. Nelson, "A Concurrent Timin Error Detection Circuit for CMOS", *Proc. 3rd IEEE Int'l On-Line Testing Workshop*, Crete, Greece, July 1997, pp. 70-74.
- Nelson, V.P. and A.D. Singh, "Yield, Defect Level and Cost Tradeoffs in MCM Substrate and Assembly Testing", *Proc. MCM Test III Advanced Technology Workshop*, Napa Valley, CA, Sep. 15-18. 1996.
- Williamson, S.T., A.D. Singh, and V.P. Nelson, "Fault and Yield Modeling of MCMs for Automotive Applications", *Proc. 5th International Conference on Multichip Modules*, Denver Colorado, April, 1996.
- Nelson, V.P. and A.D. Singh, "MTAP: A Test Advisor Program", *MCM Test II Advanced Technology Workshop*, Napa Valley, CA, Sep. 10-13 1995.
- Nelson, V.P. and A. Flint, "Test Development of a Microcontroller-Based MCM for Automotive Applications", *Proc. the 4th International Conference on Multichip Modules*, Denver Colorado, April 19-21, 1995, pp. 114-119.
- Kutz, L.J., and V.P. Nelson, "Remote Control of a Robot in a MAP Network", *Proc. AUTOFACT '89*, Detroit, MI, Oct. 30-Nov. 2, 1989.
- C.J. Wang, V.P. Nelson, and C.H. Wu, "Performance Modelling of the Modified Mesh-Connected Parallel Computer", *Proc. 9th Int'l Conf. on Distributed Computing Systems*, Newport Beach, CA., June 1989, pp 490-497.
- C.J. Wang, C.H. Wu, and V.P. Nelson, "Stochastic and Deterministic Modeling of Message Passing Parallel Computers", *Proc. 1st Ann. IEEE Symposium on Parallel and Distributed Processing*, Dallas, TX, May 1989, pp. 98-105.
- C.J. Wang and V.P. Nelson, "An augmented torus processing surface for MIMD", *Proc. Phoenix Conf. on Computers and Communications*, Scottsdale, Arizona, March 1989, pp. 97-100.
- S. Qian, V.P. Nelson, and J.M. Morris, "TMS320-Based Digital Communication Network in the AC Power Line", *Proc. 19th Annual Pittsburgh Conf. on Modeling and Simulation*, May 1988, pp xxx-xxx.
- Wang, C.J., Wu, C., and V.P. Nelson, "A Study of the Generalized Multiple Bus-Connected Parallel Computer", *Proc. 2nd Symp. on the Frontiers of Massively Parallel Computation*, Fairfax, VA, October 1988, pp.541-544.
- S. Thanawastien, J. Lo, and V.P. Nelson, "A reconfigurable multiple-SIMD/MIMD system for multi-phase space-based missions", *Proc. 7th Ann. Int'l Phoenix Conf. on Computers and Communications*, Scottsdale, AZ, March 1988, pp 62-68.

- C.J. Wang and V.P. Nelson, "A Reconfigurable Fault-Tolerant Parallel Computer - Wafer Scale Approach", Proc. IEEE Southeastcon, Tampa, FL, April 1987, pp. 216-220.
- C.J. Wang and V.P. Nelson, "Dynamic Reconfiguration Algorithms for Fault-Tolerant Multiprocessor Arrays", Proc. 6th Ann. International Phoenix Conf. on Computers and Communications, Phoenix, AZ, Feb. 1987, pp. 94-98.
- Hsu, Y.J., Nelson, V.P., and R.C. Jaeger, "A random self-test structure for LSI/VLSI chips", Proc. 7th Biennial UGIM Symposium, Rochester, NY, June 9-11, 1987.
- Y.J. Hsu, V.P. Nelson, and R.C. Jaeger, "A Gate Array Design of a Shuffle/Exchange Network Switching Element", Proc. Sixth UGIM Symp., Auburn, AL, June, 1985, pp. 158-164.
- V.P. Nelson, "Integration of Personal Computers into Electrical Engineering Curricula", Proc. 17th Symp. on System Theory, Auburn, AL, March 1985, pp. 140-144.
- S. Thanawastien and V.P. Nelson, "Diagnosis of Multiple Faults in Shuffle/Exchange Networks", Proc. 1984 Real Time Systems Symp., Austin, TX, Dec. 1984.
- S. Thanawastien and V.P. Nelson, "Task Reassignment in Shuffle/Exchange Networks", Proc. 4th Ann. Phoenix Conf. on Computers and Communications, Phoenix, AZ, March 1985.
- S. Thanawastien, V.P. Nelson, and S. Tantaratana, "Optimal Fault Detection Test Sequences for Shuffle/Exchange Networks", Proc. 13th Ann. Symp. on Fault Tolerant Computing, Milano, Italy, June, 1983, pp.442-445.
- Nelson, V.P. and R.L. Fields, "Hardware and Software Development of the FTDCCL Delta-Connected Multiprocessor", Proc. Southeast Symp. on System Theory, April 1982, Blacksburg, VA., pp. 273-276.
- Nelson, V.P. and H.L. Fellows, Jr. "The RIPCORDER - A microprocessor-controlled amusement ride", Proc. Industrial Electronics and Control Instrumentation Conf., March 1980, pp 373-376.
- Nelson, V.P. "Fault tolerance in reconfigurable multiprocessor systems", Proc. COMPSAC 1980 (invited paper), Chicago, IL, Oct. 1980, pp 372-380.
- Satischandra, D.V. and V.P. Nelson "A reconfigurable distributed digital filter", Proc. Symp. on Distributed Data Acquisition and Control, Miami, FL, Dec. 1980, pp 90-96.
- Satishchandra, D.V., Nelson, V.P. and S.A. Starks "A distributed logarithmic FFT processor", Proc. Southeastcon 1981, Huntsville, AL, pp 786-790.

MAGAZINE ARTICLES, THESES, AND OTHER MAJOR REPORTS:

- Nelson, V.P., "Safety in Numbers", Byte Magazine, August 1991, pp. 175-184.
- Nelson, V.P. "Applications of fuzzy automata to determining the orientation of three dimensional objects from live

images", MS Thesis, Ohio State University, 1977.

- Nelson, V.P. "The use of characteristic parameters for accurate reliability modeling of hybrid modular redundant digital systems", PhD Dissertation, Ohio State University, 1978.
- Nagle, H.T., Jr., V.P. Nelson, et al "Fault tolerance and architectural reliability in distributed processing systems", AU Tech Report AU-EE-79-0025-1, June. 1979.
- Nelson, V.P., et.al. "Fault-tolerance and architectural reliability in distributed data processing systems", Auburn Univ. Tech. Report AU-EE-80-0025-1, Oct. 1980.
- Nelson, V.P., et.al. "Fault-tolerance and architectural reliability in distributed data processing systems", Auburn Univ. Tech. Report AU-EE-81-0025-1, Nov. 1981.
- Nelson, V.P., et.al. "Fault-tolerance and architectural reliability in distributed data processing systems", Auburn Univ. Tech. Report AU-EE-82-0025-1, Dec. 1982.
- Nelson, V.P., et.al. "Fault-tolerance and architectural reliability in distributed data processing systems: Part I - Testbeds for BMD-DDP Systems", Auburn Univ. Tech. Report AU-EE-84-0011-1, July 1984.
- Nelson, V.P., et.al. "Fault Tolerance and Reliability in Tightly-Coupled Multiprocessor Systems for Ballistic Missile Defense", Auburn Univ. Tech. Report AU-EE-85-0011-1, August 1985.
- Nelson, V.P., et.al. "Hardware Approaches to Fault-Tolerant Multiprocessor Design for Ballistic Missile Defense", Auburn Univ. Tech. Report AU-EE-86-0050-1, August 1986.

EXTENSION AND MAJOR PROFESSIONAL ACTIVITIES

- Selected by IEEE as an ABET Program Evaluator, 2002-2007.
- Member, IEEE Computer Society "Computing Curriculum 2001 (CC2001) Committee", defining the model Computer Engineering Curriculum.
- Judge and Submission Evaluation Team leader for the IEEE Computer Society International Design Contest (CSIDC), 2002.
- Panel Member, "New Trends in EE Education", ECEDHA (ECE Department Heads) Meeting, March, 2002.
- Panel Member, "Computing Curriculum 2001 - Computer Engineering", Frontiers in Education Conference, Oct. 10-13, Reno, NV.
- Program committee member, VLSI Test Symposium (1997-99)
- Program committee member, MCM Test Workshop (1996-98)
- Consultant to Motorola (Austin, Phoenix) and Chrysler (Huntsville). Modeling and simulation of automotive multichip modules. (1995-96)
- Tutorial (with B.D. Carroll), "Introduction to Fault Tolerant

Computing", 3rd Int'l Conf. on Distributed Computing, Miami, FL, Oct. 22, 1982. Repeated at AIAA Workshop on Fault Tolerant Computing for Aerospace Systems, Ft. Worth, TX, Nov. 8, 1982 and in Berlin, West Germany in May, 1984 and September 1985.

- Director of Auburn Extension Service Short Course "Introduction to Microprocessors".
- Program Chairman, First Symposium on Distributed Data Acquisition and Control, Miami, FL, December 1980.
- Member of the Editorial Board of IEEE MICRO Journal.
- Consultant to several companies on microprocessor applications and fault tolerant system architectures for military, SDI, and aerospace applications.
- Invited participant: Distributed Systems Workshop on Fault Tolerant/ Survivable Systems for SDI, RADC, July 1986.