

Academic Curriculum Vitae
Glenn W. Cox, Ph.D.

Associate Professor, Computer Science, The University of Alabama in Huntsville
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Research Areas:

Wired and Wireless Networks, Ad Hoc Network Technology, Real-Time Modeling and Simulation, Power-Aware Mobile Communications, Software metrics.

Education:

Ph.D. (Electrical Engineering), Auburn University, 1979

Dissertation: *Automated Cell Placement Techniques for the Standard Transistor Array (STAR)*. Advisor: B. D. Carroll

M.E.E. (Electrical Engineering), Auburn University, 1976

Thesis: *Reliability Calculation Techniques for Non-Repairable Fault-Tolerant Memory Systems*. Advisor: B. D. Carroll

B.E.E. (Electrical Engineering), Auburn University, 1974

Academic Experience:

- Presently Associate Professor in the UAH Computer Science Department.

Summary of accomplishments:

- Teaching:
 - Lead Computer Networking area
 - Founded and lead CS Modeling and Simulation area
 - Have taught 43 course sections (91.4% average SIE)
- Research:
 - PI for \$269K of contract funding
 - Co-PI for \$217K NASA project
 - authored or co-authored 9 journal publications (4 published or accepted)
 - authored or co-authored 24 published conference papers and presentations
- Service:
 - Member of UAH Faculty Senate (2004-2006)
 - Member of UAH Undergraduate Curriculum Committee (2004-2006)
 - Member of UAH Patents and Copyrights committee (2005-2007)
 - Manage the CS digital logic design and computer networks labs.
 - Advisor for Undergraduate, Ph.D. and Master's students
 - 4 Master's Thesis students have graduated under my direction.
 - Chair, Huntsville IEEE CS Chapter (2004-2005), Program Chair (2002-2004)
- Other:
 - IEEE Huntsville Section Outstanding Engineer, 2006.
 - IEEE Senior Member.
 - Active consulting practice with Huntsville industry.
- Lectured for three years as a Graduate Teaching Assistant in the Electrical Engineering Department at Auburn University in the areas of Digital Logic, Computer Organization, and Assembly Language Programming.

Experience Summary:

- 2007-pres UAH CS Department, Associate Professor
- 2001-2007 UAH CS Department, Assistant Professor
- 2001-pres Independent Consultant in test bed and networking architectures.
- 1997-2001 Icdc, Operations Manager and Project Engineer.
- 1994-97 Scientific Research Corp., Sr. Program Manager/Principal Investigator.
- 1993 Potomac Research Corp., Vice President.
- 1991-93 Optimization Technology Inc., Group Director/Principal Investigator.
- 1979-91 General Research Corp., Deputy Division Director/Project Engineer.
- 1974-79 Auburn University, Research and Teaching Asst.

Selected Projects led as Principal Investigator (contract title, customer):

- 2006-pres: Systems Engineer for reconfiguration wireless voice system for US Joint Forces training range, Scientific Research Corp, U.S. Army Program Executive Officer, Simulation, Training, and Instrumentation.
 - 2004-2006: Lead Architect for Integrated Threat Cell, Scientific Research Corp, for U.S. Army Program Executive Officer, Simulation, Training, and Instrumentation.
 - 2003-pres: Signal/Data Processing Analysis Support for Multi-Mode Seeker Red Team, Sparta, Inc for U.S. Army Aviation and Missile Command.
 - 2005: Joint Test and Evaluation Methodology (JTEM) for U.S. Director Operational Test and Evaluation, Office of the Secretary of Defense.
 - 2003-04: Runtime Evaluation and Prediction for Complex Simulations, Optimization Technology, Inc, for U.S. Navy Space and Naval Warfare Systems Command.
 - 2002-04: Test and Training Enabling Architecture (TENA) Threat Simulation Assessment, Scientific Research Corporation for U.S. Director Operational Test and Evaluation, Office of the Secretary of Defense.
 - 2000-01: Virtual Threat Simulator Systems Engineering, Scientific Research Corporation, for Army Program Executive Officer, Simulation Training and Instrumentation
 - 1995-97: TACCSF Technical Support, U.S. Air Force
 - 1994-95: Joint Precision Strike Demonstration Support, U.S. Army Program Executive Officer, Intelligence and Electronic Warfare
 - 1992-93: FlightView, U.S. Army Ballistic Missile Defense Advanced Technology Center (now Space and Missile Defense Command)
 - 1987-88: Advanced Processing for Infrared Sensors, U.S. Army Ballistic Missile Defense Advanced Technology Center
 - 1986-88: Advanced Research Center Requirements & Experimentation, Colsa Corporation
 - 1984-86: Non-Nuclear Kill Avionics On-Board Processing, U.S. Army Ballistic Missile Defense Advanced Technology Center
 - 1980-85: Advanced Research Center Requirements(Basic & Follow-ons), U.S. Army Ballistic Missile Defense Advanced Technology Center
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Selected Technical Experience:

Modeling and Simulation

- Principal Investigator on a UAH contract to analyze the successes and shortcomings of the data collection and analysis segment of the Multi-Service Distributed Experiment (MSDE). This work was performed as part of a DoD effort to develop a Joint Test and Evaluation Methodology (JTEM) that would improve methods for conducting large-scale distributed test and training events. (2005. Sponsor: Scientific Research Corporation)
- Lead architect for a real-time operator-in-the-loop test center to be used by the U.S. Army PEOSTRI to simulate threat systems as part of large-scale distributed testing and training events. The goal is to enhance existing test center capabilities to facilitate joint experimentation with other centers. (2004-present. Client: Scientific Research Corporation)
- Principal Investigator on a UAH contract to determine performance-related measures for large-scale complex Course-of-Action simulations used by the U.S. Navy SPAWAR. The objective is an intelligent tool that simulation analysts can use to estimate simulation performance for specific scenarios and model parameter settings. (2003-04. Sponsor: Optimization Technology, Inc.)
- Engineering lead for assessment of the Test Enabling Architecture (TENA) developed by the U.S. Department of Defense DOT&E. TENA is a real-time distributed infrastructure designed to allow testers to connect assets at multiple ranges to form a simulated "virtual range." The assessment is focusing on the use of TENA for representation of large-scale threat and target complexes. (2002-04, Client: Scientific Research Corporation)
- Lead architect for a distributed computer simulation architecture for a U.S. Army PEOSTRI simulation center that specializes in testing the performance of foreign systems. The architecture was designed to execute distributed, operator-in-the-loop simulations that execute in real time. This work included development of unique methods for inserting one-of-a-kind hardware emulators into a running real-time distributed simulation on an as-needed basis. (2000-01. Client: Scientific Research Corporation).
- Senior Program Manager and Technical Lead for the Technical Support Contract at The US Air Force Theater Aerospace Command and Control Simulation Facility, TACCSF. TACCSF (now called DMOC), located at Kirtland AFB, New Mexico, is the USAF's primary center for distributed-simulation-based testing of control processes. Personal accomplishments included designing and evaluating enhancements to the center's architecture and local and long-haul networking elements, and also developing a growth strategy to comply with the new DoD High-Level Architecture (HLA) Distributed Simulation standard. (1995-97. Employer: Scientific Research Corporation).
- Modeling and simulation lead in the Army Program Management Office for the DoD Joint Precision Strike Demonstration (JPSD) located in Vienna, VA. JPSD developed a distributed exercise that integrated simulated and live entities in a nation-wide test. Personal work included leading the coordination of systems engineering and computing development activities, devising processes for accreditation of the distributed tests, and overseeing the development of the distributed computing networks and the distributed software for simulation, graphics, data collection, communication, and exercise control used in the test control center. (1994-95. Employer: Scientific Research Corporation).

- Lead architect for the 1986 re-development of the distributed testbed architecture of the US Army Space and Missile Defense Command ARC. This work won an open competition to define the ARC distributed architecture and resulted in a growth-oriented design. The architecture incorporated more than 60 computing nodes, including sub-networks of high-performance parallel computers. (1986. Employer: General Research Corporation)

Networking:

- Led development of tools that allow computer architects to describe and simulate the performance of distributed computer networks. Applied the tools to model the functionality of in-place distributed systems in order to determine performance limits, locate processing bottlenecks, and evaluate and recommend proposed changes for Army, Air Force, and Ballistic Missile Defense Organization. (1991-93. Employer: Optimization Technology, Inc.)
- Technical lead for the development of a prototype network simulation tool for analysis of real-time, embedded network computers. Used the prototype tool to simulate the operation of a high-performance processor/memory network connected by means of the military-standard 1553A avionics bus. (1992. Employer: Optimization Technology, Inc.)
- As Principal Investigator for the Prime Contractor, directed Mayo Clinic efforts to design the first operational distributed microprocessor system based on a 100MHz Pierce Ring interconnect (this was more than twice the clock rate of the previous record). In addition to directing the research, design, and prototyping efforts, personal efforts included developing the simulation used for concept exploration and devising the method for switching data between rings so that hierarchical networks could be implemented. (1980-82. Employer: General Research Corporation).
- As Principal Investigator for the Prime Contractor, directed efforts by the University of Texas to design and implement the first high-bandwidth Banyan network using 4-input, 4-output switching nodes (this represented a significant performance improvement over previous Banyan implementations, which had used 2-input, 2-output nodes). Personal work included developing the simulation for analysis of the network and conducting research on the effects of node fan-in and fan-out on network performance and complexity/cost. (1980-82. Employer: General Research Corporation).
- Designed an interconnect for a system of 13 super-minicomputers which implemented segmented global shared-memory using a high-bandwidth Pierce Ring network. (1980-82. Employer: General Research Corporation).

Computer/Microprocessor Architecture:

- Member of permanent Red Team reviewing test results and determining on-board processing implications for advanced missile using multi-mode seeker. (2003-pres. Client: Sparta, Inc.)
- Principal Investigator and Program Manager for developing the architecture of a Wafer-Scale-Integrated, massively parallel signal/data processor for very-high-bandwidth infrared sensors. This included development of a 16-processor grid-array that was used to demonstrate that conventional sensor algorithms could be formulated for execution on the Wafer-Scale architecture. (1987-88. Employer: General Research Corporation).
- Principal Investigator for a project to evaluate competing processing architectures (pipelined vs. conventional uniprocessor architectures) for missile guidance and

control. This work included developing a real-time testbed that simulated the operation of the architectures under realistic operational conditions. (1984-86. Employer: General research Corporation).

- Was a member of the two-person team that built the first government-owned emulation of the complete Zilog Z8002 instruction set. Used the emulation to verify an approach for distributed processing using multiple Z8002s connected in a segmented shared memory architecture. (1979-80. Employer: General Research Corporation).
- Conducted research and developed the digital logic layout algorithms used in NASA's compact integrated circuit foundry technology. The objective of this work was to develop layout procedures which produced layouts comparable in quality to those produced by optimum methods, but which (unlike the optimum methods) could be executed efficiently. This required developing novel heuristic methods incorporating user-controlled optimality. This work won two NASA Technology Innovation Awards. (1976-79. Employer: Auburn University).
- Developed the algorithms and software used to assess the reliability of a fault-tolerant memory subsystem developed for use in extremely long-lifetime NASA probes. The fault-tolerant memory used a unique bit-plane-switching architecture that resisted analysis by conventional methods and necessitated invention of open-form reliability equations and design of special purpose computer algorithms to evaluate them accurately. (1974-76. Employer: Auburn University).
- Conducted research and developed a logic simulator to model the operation of digital circuits under gate-level fault conditions. Unlike previously-developed gate-level fault models used in an educational environment, the simulator explicitly represented the propagation of fault conditions through transitional (pulse-edge) states. This required extension of the standard binary state set to an 11-state representation and research and representation of gate-logic operations on the extended set. (1974-76. Employer: Auburn University).

Professional memberships:

Senior Member, Institute of Electrical and Electronics Engineers (IEEE) (1972-present)

- 2002, Membership Chairman, Huntsville Chapter of the Computer Society
- 2002-2004, Program Chairman, Huntsville Chapter of the Computer Society
- 2004-2006, General Chairman, Huntsville Chapter of the Computer Society

Association for Computing Machinery (2001-present)
American Association for Artificial Intelligence (2003-present)
International Test and Evaluation Association (2005-present)
Society for Computer Simulation (2001-present)

Honors and Awards:

IEEE Huntsville Section Outstanding Engineer of the Year (2006)
Sigma Xi Research Honorary
Phi Kappa Phi Academic Honorary
Tau Beta Pi Engineering Honorary
Eta Kappa Nu Electrical Engineering Honorary
NASA Technology Innovation Award (1981, 1982)
National Merit Scholarship Winner (1970)

Open Literature Publications:

Journal Articles (Published or accepted):

- R. Dabney, L. Etzkorn, G. Cox, "A fault-tolerant approach to test control utilizing dual redundant processors," submitted to *Advances In Engineering Software* (Elsevier journal) accepted.
- G. Cox, S. Gholston, D. Utley, L. Etzkorn, C. Stein, P. Farrington, and J. Fortune, "Empirical validation of the RCDC and RCDE semantic complexity metrics for object-oriented software," submitted to *eCIT Journal of Information and Computing Technology*, accepted.
- H. Olague, L. Etzkorn, W. Li, and G. Cox, "Examining system design instability and progress in highly iterative, rapidly evolving object-oriented software projects," submitted to *Journal of Software Maintenance and Evolution*, Conditionally accepted, in revision.
- G. Cox, L. Etzkorn, and W. Hughes, "Cohesion metric for object-oriented systems based on semantic disambiguity," *Applied Artificial Intelligence* (Taylor and Francis Journal), accepted, to appear May 2006.
- C. Stein, G. Cox, L. Etzkorn, S. Gholston, S. Virani, P. Farrington, D. Utley, and J. Fortune, "Exploring the relationship between cohesion and complexity," *Journal of Computer Science*, vol.1, no. 2, 2005, pp. 137-144.
- L. Etzkorn, S. Gholston, J. Fortune, C. Stein, D. Utley, P. Farrington, and G. Cox, "A comparison of cohesion metrics for object-oriented systems," *Information and Software Technology* (Elsevier Journal), vol. 46, no 10, Aug 2004, pp 677-687.
- G. Cox and B. D. Carroll, "Reliability modeling and analysis of fault-tolerant memories," *IEEE Transactions on Reliability*, vol. R-27, pp. 49-54, 1978.

Journal Articles (submitted):

- R. Aygun, Yi Ma, G. Cox, and K. Akkaya, "A taxonomy of data management techniques in peer-to-peer systems," submitted to *IEEE Journal on Selected Areas in Communications*, Dec. 2005.
- C. Stein, S. Virani, S. Gholston, L. Etzkorn, D. Utley, and G. Cox, "Early software qualification through semantic program understanding," submitted to *Computing and Informatics*, Mar. 2005.
- C. Stein, L. Etzkorn, S. Gholston, P. Farrington, D. Utley, G. Cox, and J. Fortune, "An evaluation of semantic metrics for object-oriented software," submitted to *Applied Artificial Intelligence*, Apr. 2005.
- D. Carter, R. Aygun, G. Cox, M. Weisskopf, and L. Etzkorn, "The Effect of Uncontrolled Concurrency on Model Checking," submitted to *Concurrency and Computation: Practice and Experience*, under review.

Conference Papers:

- H. Olague, L. Etzkorn, and G. Cox, "An entropy-based approach to assessing object-oriented software maintainability and degradation," *The 2006 International Conference on Software Engineering Research and Practice (SERP 06)*, Las Vegas, NV, Jun. 2006.
- G. Cox, J. Allen and G. Rumford, "Threat and target system interoperability Testing (T2SIT) TENA assessment," *Proc. Annual International Symposium of the International Test and Evaluation Association*, Huntsville, AL, Aug, 2004.
- L. Etzkorn, C. Stein, G. Cox, S. Gholston., D. Utley, and P. Farrington, "Examining a semantic metrics suite for object-oriented design," *Proc. 4th Annual NASA Office of Safety and Mission Assurance Software Assurance Symposium*, OSMA SAS 2004, Morgantown, West Virginia, July, 2004.

- C. Stein, L. Etzkorn, D. Utley, P. Farrington, G. Cox, J. Fortune, and S. Gholston. "Computing software metrics from design documents," *Proc. 42nd Annual ACM Southeast Conference*, Huntsville, AL, April 2-3, 2004.
- C. Stein, L. Etzkorn, G. Cox, P. Farrington, S. Gholston, D. Utley, and J. Fortune. "A new suite of semantic metrics for object-oriented software," *Proc. 1st International Workshop on Software Audit and Metrics*, Porto, Portugal, April 13-14, 2004
- G. Cox, D. Carver, G. Rumford, "Range-based threat/target simulation using the Test and Training Enabling Architecture (TENA)," Huntsville Simulation Conference, The Society for Modeling and Simulation, Huntsville, AL, Oct 30-31, 2003.
- G. Cox, L. Etzkorn, and Z. Pajnigara, "On battery conservation strategies for wireless protocols," *Proc. International Conference on Wireless Networks (ICWN'03)*, Las Vegas, Nevada, June 23-26, 2003.
- G. Cox and L. Etzkorn, "Power-related performance of 802.11 protocols," *Proc. International Conference on Wireless Networks (ICWN'03)*, Las Vegas, Nevada, June 23-26, 2003.
- G. Cox, "Considerations for a fidelity-agile simulation architecture," *Proc. Summer Computer Simulation Conference*, The Society for Modeling and Simulation International, Orlando, Florida, July 2001.
- C. Collum, G. Cox, T. Johnson, and J. Shih, "The use of distributed processing testbeds in the development of missile and spacecraft onboard systems," *Proc. AIAA Strategic/Tactical Missile and Space Sciences Meeting*, 1984.
- T. Williams, W. McDonald, M. Beasley, and G. Cox, "A hardware architecture for a flexible distributed computing testbed," *Proc. IEEE Conference on Distributed Data Processing*, 1982.
- D. Hardin, G. Cox, and H. Fitzgibbon, "Network switching issues in real-time distributed data processing," *Proc. IEEE Region 3 Conference*, 1981.
- G. Cox and B. Carroll, "The Standard Transistor Array (STAR) part II, automatic cell placement techniques," *Proc. IEEE Design Automation Conference*, 1980.
- M. Fleming, G. Cox, and B. Carroll, "Time-Out: a graphical output package for a logic simulator," *Proc. IEEE Region 3 Conference*, pp. 300-302, 1978.
- G. Cox and B. Carroll, "A memory system reliability model," *Proc. Fault Tolerant Computing Conference*, pp. 203-208, 1977.
- G. Cox and B. D. Carroll, "A reliability analysis of fault-tolerant memories," *Proc. International Symposium on Fault Tolerant Computing*, pp. 193-198, 1976.
- B. D. Carroll and G. Cox, "Teaching logic circuit fundamentals using logic simulation programs," *Proc. Frontiers in Education Symposium*, pp. 107-113, 1975.
- G. Cox and B. Carroll, "A logic simulator and its uses in education," *Proc. IEEE Region 3 Conference*, pp. 4A-3-1 to 4A-3-8, 1975.
- B. Carroll and G. Cox, "A logic simulator and its uses in education," *Proc. Hewlett-Packard All Users Meeting*, 1974.

Presentations:

- G. Cox, A. Datta, and L. Etzkorn, "Modeling approach to support performance comparison of competing peer-to-peer network architectures," *Huntsville Simulation Conference*, Oct 26-27, 2005.
- G. Cox, J. Allen, and G. Rumford, "Remote initialization and emissions modeling of radar simulations in TENA," *Huntsville Simulation Conference*, The Society for Modeling and Simulation, Huntsville, AL, Oct. 2004.

V. Narayan, G. Cox, and C. McGraw, "Development of a profiler for object-oriented discrete event simulations," *Huntsville Simulation Conference*, The Society for Modeling and Simulation, Huntsville, AL, Oct. 2004.

G. Cox, P. Elangovan, and C. McGraw, "Forecasting execution times of discrete event simulations for course-of-action analysis," *Huntsville Simulation Conference*, The Society for Modeling and Simulation, Huntsville, AL, Oct 30-31, 2003.

V. Narayan, G. Cox, and C. McGraw, "Development of a profiler for object-oriented discrete event simulations," *Huntsville Simulation Conference*, The Society for Modeling and Simulation, Huntsville, AL, Oct 30-31, 2003.

S. Prabhu, G. Cox, and C. McGraw, "Benchmarking for object-oriented discrete event simulations," *Huntsville Simulation Conference*, The Society for Modeling and Simulation, Huntsville, AL, Oct 30-31, 2003.