

Tyson S. Hall, PhD

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Professional/Research Interests

- Research and development of digital, analog, and mixed-signal prototyping systems
- Development of engineering and embedded systems curriculum that focuses on interdisciplinary design experiences using FPGAs

Education

2001 – 2004	Georgia Institute of Technology , Atlanta, GA Doctor of Philosophy in Electrical and Computer Engineering – Research Area: Field-Programmable Analog Arrays
2000 – 2001	Master of Science in Electrical and Computer Engineering – Technical Area: Computer Engineering / Digital Signal Processing
1997 – 1999	Bachelor of Science in Computer Engineering – Technical Area: Systems and Architecture – GPA: 3.98 / 4.0 (Highest Honors)
1995 – 1997	Southern Adventist University , Collegedale, TN Attended (Pre-Engineering) – Technical Area: Computer Engineering – GPA: 3.98 / 4.0

Work Experience

2010 – present	School of Computing / Southern Adventist University , Collegedale, TN Professor
2009 – present	Director, Center for Innovation and Research in Computing
2007 – 2010	Associate Professor
2005 – 2007	Assistant Professor
2001 – 2004	ECE / Georgia Institute of Technology , Atlanta, GA Graduate Research Assistant Responsibilities include research on reconfigurable digital and analog systems; development of FPGA systems to support research and teaching activities; management of the equipment, property, and policies of the Cooperative Analog/Digital Signal Processing laboratory; and curriculum development for a course on DSP implementations of FPGAs.
2000	Lead Graduate Teaching Assistant Responsibilities include teaching and operation of the Computer Engineering Digital Hardware Laboratory, management and coordination of laboratory personnel (includes nine graduate teaching assistants and 20 undergraduate teaching assistants), design and development of laboratory robotics and PLD projects, manuals and curriculum development, and classroom lecturing.

Consulting Activities

- Thomas, Kayden, Horstemeyer & Risley LLP (2008): Reverse engineering of microcontroller-based embedded system.
- Gardner Carton & Douglas LLP (2006): Reverse engineering of digital hardware systems; analysis of data flow through system.
- GTronix (Aug. 2004 – Feb. 2005): System architectures for commercial floating-gate based analog processing ICs.
- Cloud9 Simulations (Feb. 2003 – Sept. 2004): Board design, layout, and manufacturing for a flight simulator controller; firmware development for controller including USB interface, analog data acquisition, and data preprocessing.

Awards and Honors

	Institute of Electrical and Electronics Engineers (IEEE)
2006	– Frontiers in Education Conf. NAE/CASEE New Faculty Fellow
2003	– IEEE Transactions on Education Best Paper of the Year Award
	Southern Adventist University
2006	– Young Alumnus of the Year
	Georgia Institute of Technology
2000 – 2004	– President's Fellowship (granted for 5 years)
1999	– ECE Outstanding Graduate Teaching Assistant
1999	– ECE Senior Scholar
1999	– Computer Engineering Senior Honors Representative

Committees and Appointments

	American Society for Engineering Education (ASEE)
2010 – present	– ASEE Southeastern Section Vice-President (Awards and Recognition Unit)
2010 – present	– ASEE Southeastern Section Programs Unit Officer (Secretary)
2008 – present	– ASEE Southeastern Section Awards and Recognitions Unit Officer (Chair, Vice-Chair, Secretary)
2007 – 2010	– ASEE Southeastern Section Instructional Division Officer (Chair, Vice-Chair, Secretary)
2005 – 2008	– ASEE Southeastern Section Computer Engineering and Technology Division Officer (Chair, Vice-Chair, Secretary)
	Southern Adventist University
2009 – present	– SACS Leadership Team
2009 – present	– SACS Steering Committee, Chair
2009 – present	– SACS Working Committee, Chair
2009 – present	– Assessment & Effectiveness Review Committee
2008 – present	– School of Religion Program Review Committee, Chair
2006 – present	– School of Computing ABET Accreditation Committee, Chair
2005 – present	– Adventist Robotics League Southern Challenge, Chair and Event Manager
2008 – 2009	– University Senate Taskforce on Academic Policies
2007 – 2009	– Modern Languages Program Review Committee, Chair
2007 – 2009	– University Senate, Parliamentarian in '07-08
2007 – 2008	– University Senate Taskforce on Academic Restructuring, Chair
2006 – 2008	– Audio-Visual Services Committee
2005 – 2007	– Distinguished Service Medallion Subcommittee

Community / Church

2010 – present	– Bowman Hills SDA Head Elder
2006 – present	– Bowman Hills SDA Elementary School Board, Technology Committee Chair
1992 – present	– Bowman Hills SDA Church Organist and Pianist
2004 – 2010	– Bowman Hills SDA Church Elder
2009, 2006	– Bowman Hills SDA Church Nominating Committee, Chair
2005 – 2009	– Sunbelt/Cohutta Springs Triathlon Planning Committee, Technology Coordinator
2007 – 2008	– Georgia-Cumberland Conference Subcommittee on Keyboarding Curriculum

Other Service

Reviewed manuscripts for the following conferences in past 5 years:

- ASEE Southerneastern Section Annual Meeting
- IEEE Microelectronics Systems Education Conference
- IEEE International Symposium on Circuits and Systems

Reviewed manuscripts for the following journals in past 5 years:

- IEEE Transactions on Education
- ETRI Journal
- VLSI Journal

Courses Taught

CPTR 103	Principles of Computing (3 hrs)
CPTE 109	Presentation Technology (1 hr)
CPHE 200	Digital Logic and Design (4 hrs)
CPHE 222	Organization, Architecture, and Assembly Lanugage (4 hrs)
CPHE 310	Introduction to Signal Processing (4 hrs)
CPHE 320	Circuit Analysis (4 hrs)
CPTR 368	Digital Design Lab (3 hrs)
CPHE 380	Microcontroller Design (4 hrs)
CPHE 410	Computer Interfacing (4 hrs)
CPTR 486	Senior Seminar (2 hrs)
NOND 101	Southern Connections (1 hr)

Selected Publications & Presentations

Books

- [1] J. O. Hamblen, T. S. Hall, and M. D. Furman, *Rapid Prototyping of Digital Systems: The SOPC Edition*. Springer, Aug. 2007.
- [2] ———, *Rapid Prototyping of Digital Systems: The Quartus II Edition*. Springer, Aug. 2005.
- [3] M. D. Furman and T. S. Hall, *Digital Hardware Laboratory Manual*. North Chelmsford, MA: Erudition Books, Aug. 2001.

Journal Articles

- [1] J. O. Hamblen and T. S. Hall, “Using system-on-a-programmable-chip technology to design embedded systems,” *International Journal of Computers and Their Applications*, vol. 13, no. 3, pp. 142–152, Sept. 2006.
- [2] T. S. Hall, C. M. Twigg, J. D. Gray, P. Hasler, and D. V. Anderson, “Large-scale field-programmable analog arrays for analog signal processing,” *IEEE Transactions on Circuits and Systems I*, vol. 52, no. 11, pp. 2298–2307, Nov. 2005.

- [3] T. S. Hall and D. V. Anderson, "A framework for teaching real-time digital signal processing with field-programmable gate arrays," *IEEE Transactions on Education*, vol. 48, no. 3, Aug. 2005.
- [4] T. S. Hall, C. M. Twigg, P. Hasler, and D. V. Anderson, "Developing large-scale field-programmable analog arrays for rapid prototyping," *International Journal of Embedded Systems*, vol. 1, no. 3/4, pp. 179–192, 2005.
- [5] T. S. Hall and J. O. Hamblen, "System-on-a-programmable-chip development platforms in the classroom," *IEEE Transactions on Education*, vol. 47, no. 4, pp. 502–507, Nov. 2004.
- [6] K. Newman, J. O. Hamblen, and T. S. Hall, "An introductory digital design course using a low-cost autonomous robot," *IEEE Transactions on Education*, vol. 45, no. 3, pp. 289–296, Aug. 2002.

Conference Papers

- [1] J. E. Neufeld and T. S. Hall, "Probabilistic location of a populated chessboard using computer vision," in *Proc. 2010 IEEE International Midwest Symposium on Circuits and Systems*, Seattle, WA, Aug. 2010, accepted.
- [2] D. V. Anderson and T. S. Hall, "Teaching hardware design of fixed-point digital signal processing systems," in *Proc. 2007 American Society for Engineering Education Annual Conference and Exposition*, Honolulu, HI, June 2007.
- [3] T. S. Hall and J. O. Hamblen, "Using an FPGA processor core and embedded linux for senior design projects," in *Proc. 2007 IEEE International Conference on Microelectronic Systems Education*, San Diego, CA, June 2007, pp. 33–34.
- [4] T. S. Hall, J. Bruckner, and R. L. Halterman, "A novel approach to an embedded systems curriculum," in *Proc. 36th Annual Frontiers in Education Conference*, San Diego, CA, Oct. 2006.
- [5] T. S. Hall and J. O. Hamblen, "Using FPGAs to simulate and implement digital design systems in the classroom," in *Proc. 2006 American Society for Engineering Education Southeastern Section Annual Meeting*, Tuscaloosa, AL, April 2006.
- [6] T. Hall and C. Twigg, "Field-programmable analog arrays enable mixed-signal prototyping of embedded systems," in *Proc. 2005 IEEE International Midwest Symposium on Circuits and Systems*, Cincinnati, OH, Aug. 2005, invited paper.
- [7] T. S. Hall and P. Hasler, "Field-programmable analog arrays enable analog signal processing education," in *Proc. 2005 American Society for Engineering Education Southeastern Section Annual Meeting*, Chattanooga, TN, April 2005.
- [8] F. Baskaya, S. Reddy, S. K. Lim, T. Hall, and D. Anderson, "Mapping algorithm for large-scale field programmable analog array," in *Proc. 2005 ACM International Symposium on Physical Design*, San Francisco, CA, April 2005.
- [9] T. S. Hall and D. V. Anderson, "Merging theory and implementation: a framework for teaching DSP hardware design," in *Proc. 2004 American Society for Engineering Education Annual Conference and Exposition*, Salt Lake City, UT, June 2004.
- [10] T. S. Hall, C. M. Twigg, P. Hasler, and D. V. Anderson, "Application performance of elements in a floating-gate FPAA," in *Proceedings of the 2004 IEEE International Symposium on Circuits and Systems*, Vancouver, BC, May 2004, pp. II.589–II.592.
- [11] G. Serrano, P. Smith, H. J. Lo, R. Chawla, T. Hall, C. Twigg, and P. Hasler, "Automatic rapid programming of large arrays of floating-gate elements," in *Proceedings of the 2004 IEEE International Symposium on Circuits and Systems*, Vancouver, BC, May 2004, pp. I.373–I.376.
- [12] T. S. Hall, C. M. Twigg, P. Hasler, and D. V. Anderson, "Developing large-scale field-programmable analog arrays," in *Proc. 18th International Parallel and Distributed Processing Symposium*, Santa Fe, New Mexico, April 2004.
- [13] J. O. Hamblen and T. S. Hall, "Engaging undergraduate students with robotic design projects," in *Proc. Second IEEE International Workshop of Electronic Design, Test, and Applications (DELTA)*, Perth, Australia, Jan. 2004.
- [14] T. S. Hall and D. V. Anderson, "From algorithms to gates: Developing a pedagogical framework for DSP hardware design," in *Proc. IEEE Signal Processing Society's 2nd Signal Processing Education Workshop*, Pine Mountain, GA, Oct. 2002.
- [15] T. S. Hall, P. Hasler, and D. V. Anderson, "Field-programmable analog arrays: A floating-gate approach," in *Proc. 12th International Conference on Field Programmable Logic and Applications*, Montpellier, France, Sept. 2002, pp. 424–433.

Other Papers

- [1] J. D. Dugger, T. S. Hall, P. Hasler, D. V. Anderson, P. D. Smith, M. R. Kucic, and A. Bandyopadhyay, *Floating-gate analog circuit*, May 2005, U. S. Patent #6,898,097.
- [2] T. S. Hall, "Field-programmable analog arrays: A floating-gate approach," Ph.D. dissertation, Georgia Institute of Technology, Atlanta, GA, July 2004.
- [3] P. Hasler, T. S. Hall, and C. M. Twigg, "Large-scale field-programmable arrays," in *The Neuromorphic Engineer*, March 2005, vol. 2, no. 1, pp. 1,10.

Presentations

- [1] T. S. Hall, *Using system-on-a-programmable chip technology to design embedded systems*, Oak Ridge Design Festival, Oak Ridge, TN, Nov. 2008.
- [2] ———, *A laboratory framework for the synthesis and analysis of DSP hardware systems*, 2008 American Society for Engineering Education Southeastern Section Annual Meeting, Memphis, TN, Apr. 2008.