

SUMMARY VITA – Claire L. McCullough, Ph.D., P.E.
Professor

Years on Faculty: 10 (original appointment 08/01/99)

Degrees:

B.E. (E.E.), Vanderbilt University, 1980, summa cum laude

M.S.E.E., Georgia Institute of Technology, 1981

Ph.D. (E.E.), University of Tennessee, 1988

Ph.D. Thesis: "Error Considerations in Distributed Estimation of Nonlinear Stochastic Systems"

Experience:

Professor of Computer Science and Engineering, University of Tennessee in Chattanooga, August 2007 to present.

In addition to duties below, leads in ABET activities for the department for both Computer Science and Computer Engineering programs. Apply research in areas including data fusion to both medical and defense fields, and publish papers in these areas.

Professor of Electrical Engineering, University of Tennessee in Chattanooga, August 1999 to 2007. (Associate Professor until promotion in 2004). Taught courses in such areas as Communications, Controls, and Signal Processing. Conducted research in areas including data fusion and intelligent control, and published papers in these areas. Mentored students and provided guidance in both technical and career matters. Provided leadership in the development of web pages, curriculum, and ABET assessment for the Electrical Engineering program. Principal investigator of "Adventures in Computers, Engineering, and Space," a program funded by the National Science Foundation, to attract women to engineering, computer science, and space sciences through middle school exposure to these fields. Co-Principal Investigator of "Bridges to Engineering Science: Teaching Teachers," a planning grant from the National Science Foundation to develop a program to increase the number of under-represented students entering engineering by inserting engineering science content into K-12. Provided leading edge research consulting services to industry and to the Department of Defense.

Senior Electronics Engineer, Sensors Directorate, U.S. Army Space and Strategic Defense Command, March 1995 to August 1999. Managed technology efforts in areas such as advanced radar components; microelectronic packaging for reduction of size, weight, and power; automatic target recognition and sensor data fusion for both airborne platforms and seeker applications, fusing information from conventional radar, infrared and ladar sources; and software development. Former action officer for the Discoverer II satellite groundstation program. Developed web pages for Sensors Directorate and applications. Served as resource person in the area of intelligent processing for the ERINT guidance processing unit IPT. Conducted research in the areas of data fusion and intelligent control, and published papers in these areas.

Senior Electronics Engineer, Advanced Technology Directorate, U.S. Army Space and Strategic Defense Command, March 1992 to March 1995. Managed engineering research in emerging technology areas such as neural nets, fuzzy logic, intelligent processing, and electro-optics, with small businesses, universities, and major defense contractors. Conducted research in the area intelligent control, and published papers in this area.

Assistant Professor of Electrical and Computer Engineering, University of Alabama in Huntsville, September 1988 to March 1992. Taught courses in electrical engineering, controls, and robotics. With a graduate student, designed, built, and tested a small mobile robot. For NASA, designed, simulated, and evaluated neural network and fuzzy logic controllers for a flexible beam. Developed and simulated a new method of adaptive neural net control for nonlinear systems, and a new type of anticipatory neuro-fuzzy control. Wrote and presented technical papers on these, and other aspects of controls and reliability. Designed and ran a program (funded by the National Science Foundation) to attract women and minorities to careers in engineering.

Instructor of Electrical and Computer Engineering, University of Tennessee, September 1983 to August 1988.

Taught undergraduate courses in all aspects of electrical engineering, including controls, communications, and digital logic design. Designed laboratory experiments for these courses. Conducted research evaluating error considerations and stability of nonlinear stochastic systems, and wrote technical papers on these topics.

Other Duties:

Pursued research funding through the U.S. Navy and Adaptive Methods (a local small business) to begin working on fusion of information from disparate sensors for an improved situational assessment for anti-submarine warfare scenarios. This led, in the current school year, to two task orders, for a total funding of approximately \$45,000. Both task orders were successfully completed, and a proposal for longer-term funding has led to inclusion of UTC as

an approved subcontractor in Adaptive Methods new contract with the Navy. Negotiations are currently on-going for continuing funding. This work has led to the submission of two papers, and the thesis of a Computer Science graduate student, expected to graduate in summer. 2009. Average time spent was 8 hours per week during the 2008-2009 school year.

Committee Memberships:

UTC chapter of Sigma Xi (treasurer), Faculty Senate, UTC Grade Appeals Committee, UTC Honor Court, Women's Studies Advisory Council, ABET accreditation visitor, Computer Engineering Unit of the American Society of Engineering Education Southeastern region (secretary), department ABET Assessment Committee (chair), Computer Engineering Curriculum committee (chair) in beginning the necessary assessment for the planned ABET accreditation visit, and in suggesting curriculum changes to better meet the needs of future CPEN students.

Publications: (last 5 years)

- Jim Farrell, C. L. McCullough, and Robert Canavan, "Automated metrics assessment system for track fusion," presented at the SPIE Defense Security and Sensing conference on Signal Processing, Sensor Fusion, and Target Recognition, Orlando, Florida, 13-15 April 13, 2009.
- Kathy Winters and C. L. McCullough, "A Student-Designed Computer System to Aid ABET Assessment: *Using One ABET Requirement to Fulfill Another*," presented at the American Society for Engineering Education Southeastern Regional conference, Marietta, GA, April 6-7, 2009.
- C. L. McCullough and P. Hoadley, "Information Literacy of Freshmen and Seniors at UTC and VMI," oral presentation, presented at the American Society of Engineering Education Southeastern Regional conference, Memphis, TN, April 2008.
- C. L. McCullough, A. J. Novobilski, F. M. Fesmire, "Use of Neural Networks to Predict Adverse Outcomes from Acute Coronary Syndrome for Male and Female Patients "to be presented at the 2007 International Conference on Machine Learning and Applications, Cincinnati, Ohio, December 2007.
- C. L. McCullough, "ABET EC 2000: How Has It Changed? Has It Accomplished What Was Intended " presented at the American Society for Engineering Education Southeastern Section Conference, Louisville, KY, April, 2007.
- C. L. McCullough, A. J. Novobilski, F. M. Fesmire, "Prediction of adverse outcomes of Acute Coronary Syndrome using intelligent fusion of triage information with HUMINT," presented at the presented at the SPIE Aerosense Conference, Orlando, FL, April 2006.
- C. L. McCullough, "Information Literacy: A Critical Component in Engineering Practice in the Twenty-First Century," presented at the American Society for Engineering Education Southeastern Section Conference, Tuscaloosa, Alabama, April, 2006.
- C. L. McCullough, "ABET Assessment: Is It Really as Difficult as It Seems?" presented at the American Society for Engineering Education Southeastern Section Conference, Chattanooga, TN, April, 2005.

Other scholarly activity during the last 5 years: grants, sabbaticals, software development, etc.:

During a sabbatical in fall semester 2006, the major focus of Dr. McCullough's research was use of neural networks applied to medical data from Erlanger Heart/Stroke Center obtained with the help of Dr. Andrew Novobilski. The data was collected from 2,148 consecutive chest pain patients at the Emergency Room of the Erlanger Medical Center in Chattanooga. Goal of the work was to predict adverse patient outcome related to Acute Coronary Syndrome (ACS) within 30 days of the initial Emergency Room visit. Adverse outcomes were defined as heart attack, angioplasty and/or placement of a stent, by-pass surgery, life-threatening cardiac-related complication, or cardiac death. This work led to presentation of a research paper at the 2007 International Conference on Machine Learning and Applications, Cincinnati, Ohio.