DR. LAURA L. PULLUM

EDUCATION

SOUTHEASTERN INSTITUTE OF TECHNOLOGY, HUNTSVILLE, AL
1992 Doctorate of Science (D.Sc.), Systems Engineering and Operations Research
1990 MBA Business Administration

UNIVERSITY OF ALABAMA IN HUNTSVILLE, HUNTSVILLE, AL
1987 M.S. Operations Research
1982 B.S. Mathematics

GEORGIA INSTITUTE OF TECHNOLOGY, ATLANTA, GA
1995 Certificate, Software Engineering, Continuing Education

UNIVERSITY OF TENNESSEE, KNOXVILLE, TN
2015 M.S. Geology

PROFESSIONAL EXPERIENCE

OAK RIDGE NATIONAL LABORATORY, Oak Ridge, TN; Sept. 2009 – Present

Sr. Research Scientist (Sept. 2009 – present), Computational Data Analytics Group

Conduct in dependability of data analytics applications, machine learning systems, complex systems, and multi-agent systems. Conduct research and development in dependability of data analytics, machine learning, complex systems, and multi-agent applications in antimicrobial resistance, cybersecurity, photogrammetrics, biosurveillance, nuclear plant control, etc.

Current/Recent Projects:

- Verification, Validation and Uncertainty Quantification of Machine Learning Systems (PI)
- ORCA (Oak Ridge Cyber-Analytics) – V&V Lead
- Oak Ridge Biosurveillance Toolkit (ORBiT) (co-I)
- PRIMUS Photogrammetric System – V&V Lead
- NIMBioS working group on Modeling Antimicrobial Resistance Intervention (Systems Analysis Lead)
- NEET (Nuclear Energy Enabling Technologies) – safety and fault tolerance of next generation nuclear plants
- Demonstrating a Novel Bio-defense Capability using Public Health Data Informatics (PI)
- Biosurveillance Ecosystem GovCloud Framework (PI)
- Verification and Validation of Agent-Based Disease Spread Models (PI)
- Digital Technology Qualification - Mitigation of Digital Common-Cause Failure Vulnerabilities for Nuclear Qualified Applications (co-PI)
- Biosurveillance Data Analysis and Decision Support (LDRD) – intelligent crawlers, information confidence measures, data fusion
- CMS – Data Analytics and Dependability for Medicare and Medicaid
- DAMSEL – dependability of a multi-modal learning system for radiologist assistant

system.

LOCKHEED MARTIN, Eagan, MN; 2007 – Aug. 2009

Principal Research Scientist (Jan. 2007 – Aug. 2009), Advanced Research Group

Conduct research in dependability of complex systems, including

- dependability of composite applications in service-oriented architectures,
- certification of single and multi-UAV systems,
- robust task allocation algorithms, and
- dependability of multi-agent systems.

Particpant in Advanced Software Technology Focus Group and Software and Systems Initiative to develop a corporate software research agenda.

INSTITUTE FOR SCIENTIFIC RESEARCH, INC. (ISR), Fairmont, WV; 2002 – 2006

Vice-President of Concepts, Research and Advanced Development (July 2004 – Oct. 2006)
Director of Research and Advanced Concepts (Oct. 2003 – July 2004)
Science and Systems Engineering Group Manager (July 2003 – Oct. 2003)
Systems Engineering Branch Supervisor (March 2003 – July 2003)
Principal Scientist (Dec. 2002 – Oct. 2006)

[management experience omitted]

Responsible for securing funding, directing and performing research and advanced development in the dependable systems arena, including software fault tolerance, safety, data mining, system prognostics, software security and privacy, and reliability.

- ISR Principal Investigator (PI) on the following efforts: NASA Independent Verification and Validation (IV&V) Omnibus contract; Law Enforcement Information Technology and Analysis Program project; Data Driven Prognostics Small Business Technology Transfer (STTR) contract.
- Performed needs analysis, architecture design, and business case development for placing an additional Earth Orbiting Satellite (EOS) CLASS node at the NASA IV&V facility.
- Performed research to develop an IV&V methodology for adaptive neural network systems (ANNS). The research includes standards compliance guidance, hazard and risk analysis, and failure modes and effects analysis (FMEA) for ANNS.

HEMISPHERIC CENTER FOR ENVIRONMENTAL TECHNOLOGY (HCET) AT FLORIDA INTERNATIONAL UNIVERSITY (FIU), Miami, FL; 2001 – 2002

Research Coordinator for Advanced Software Technology (Visiting Professor)

Direct HCET's advanced software technology research and development program, comprising ~20 computer scientists and programmers. Major responsibilities include: develop strategic and technical direction for HCET's advanced software technology research program; secure research funding; influence policies, procedures, and operations to support HCET's R&D programs; coordinate participation of graduate students in the R&D of advanced software technology and software engineering; and supervise graduate students in thesis and dissertation research.

QUALITY RESEARCH ASSOCIATES, INC. (QRA), DeBary, FL; 1992 – 2001

President/Founder

Responsible for company operations, business development and technical operations. Conducted R&D in dependable systems and software engineering, and was the PI on numerous Small Business Innovation Research (SBIR) efforts, Broad Agency Announcement (BAA) contracts, and other contracted R&D efforts.

- Investigated risk metrics for software fault tolerance for the Air Force Office of Scientific Research in collaboration with Howard University.
- Co-developed software library of fault tolerant reuse code.
- Performed independent Software Quality Assurance (SQA) for commercial software development companies.
- PI, NASA research contract, fault-tolerant object-oriented code generator.
- Subcontractor PI on National Science Foundation research contract to investigate adding fault tolerance capabilities to CORBA.
- Subcontractor PI on USAF research contracts to investigate and develop fault tolerant intelligent agents.
- PI on research contracts investigating data diverse software fault tolerance techniques for C^3I technologies for the Air Force Rome Laboratory. Developed the Software Fault Tolerance Design Assistant.
- PI on NSF research contract to investigate and develop a combined hardware and software fault tree analysis methodology.
- PI on NASA research contract to investigate software design fault risk identification and mitigation.
- Co-author of award-winning paper on the SHADETree fault tree analysis methodology.
- Presented tutorials on software fault mitigation techniques – Software Fault Tolerance and Software Testing.
- Performed research in software fault tolerance leading to the development of the Centurion software fault tolerance design, analysis, and evaluation tool.

ISX CORPORATION, Marietta, GA; 1991 – 1993

Senior Systems Engineer

Responsibilities included project management, business development, and software engineering.

- Performed design and prototype development of the Terminal Management System, a system that manages networks of automated teller machines (ATMs). Primarily involved in the design and development of the expert system that provides fault diagnosis and proposes fault recovery resolutions to ATM error notifications.
- Developed Intelligent User Interface Evaluation System, which provides designers of intelligent user interfaces the means to evaluate alternative design features (such as intelligent aiding, information management, and error detection and tolerance).

SRS TECHNOLOGIES, INC., Huntsville, AL; 1982 – 1991

Principal Staff Engineer

Responsible for R&D and analysis in several areas including fault tree analysis, reliability and fault tolerance, BM/C^2 decision aids, system modeling and analysis, network simulation and analysis, concept definition, and systems effectiveness analysis.

- Co-designed and -developed a fault tolerant system development and evaluation tool set - the Automated Fault Tolerance Evaluator.
- Designed a discrete-event tool for the generation of event streams for command decision development.
- PI for the Centurion software fault tolerance design, analysis, and evaluation tool effort.
- Performed analysis and modeling for the BM/C^3 Advanced Fault Tolerant Computer System effort in fault tolerance strategies and techniques at the system and intra-facility level.

PATENT

U.S. Patent # 6,212,649 B1, "System and Method for Providing Highly-Reliable Coordination of Intelligent Agents in a Distributed Computing Environment," (co-inventor), 2001.

SELECTED PUBLICATIONS

BOOKS

Pullum, Laura, Brian Taylor, and Marjorie Darrah, *Guidance for the Verification and Validation of Neural Networks*, IEEE Computer Society Press (Wiley), 2007.

Taylor, Brian, Marjorie Darrah, Laura Pullum, et al., *Methods and Procedures for the Verification and Validation of Neural Networks*, Brian Taylor, ed., Springer-Verlag, 2005.

Pullum, Laura, *Software Fault Tolerance Techniques and Implementation*, Artech House Books, 2001.

PEER-REVIEWED PAPERS

Margevicius, K J, N. Generous, E Abeyta, L. Pullum, A. Ramanathan, A. Deshpande, et al. (2016). "The Biosurveillance Analytics Resource Directory (BARD): Facilitating the Use of Epidemiological Models for Infectious Disease Surveillance." *PLoS ONE* 11(1):e0146600, January 2016, DOI: 10.1371/journal.pone.0146600.

Ozmen, Ozgur, Laura Pullum, et al. "Augmenting Epidemiological Models with Point-of-Care Diagnostics Data." *PLoS ONE* 11(4), 1-13, (2016).

Ozmen, Ozgur, Laura Pullum, et al. "Analyzing the Impact of Modeling Choices and Assumptions in Compartmental Epidemiological Models." *SIMULATION: Transactions of The Society for Modeling and Simulation International* 92, no. 5, 1-13, (2016).

Ramanathan, A., L. Pullum, et al. "Sequential Pattern Mining of Electronic Healthcare Reimbursement Claims: Experiences and Challenges in Uncovering How Patients are Treated by Physicians." *IEEE International Conference on Big Data* (IEEE Big Data), 2016.

Ramanathan, A., L. Pullum, et al. "Constructing Patient Specific Clinical Trajectories from Electronic Healthcare Reimbursement Claims using Sequential Pattern Mining." *HI-POCT15, the NIH-IEEE Strategic Conference on Point of Care Technologies for Precision Medicine*, 2016

Quinn, S., Ramanathan, A., L. Pullum, et al. "Dr. Twitter: The Logistics of Practical Disease Surveillance using Social Media." *IEEE International Conference on Biomedical and Health Informatics*, 2016.

Quinn, S., Ramanathan, A., l. Pullum, et al. “Tracking Alcohol and Marijuana Usage and Behaviors from Social Media Using Oak Ridge Bio-Surveillance Toolkit.” *IEEE International Conference on Biomedical and Health Informatics*, 2016.

Ramanathan, A., Pullum, L., S. Jha, et al. “Integrating Symbolic and Statistical Methods for Testing Intelligent Systems: Applications to Machine Learning and Computer Vision.” *IEEE Design, Automation & Test in Europe (DATE)*, 2016.

Ramanathan, A., Laura Pullum, et al. “Discovering Multi-scale Co-occurrence Patterns of Asthma and Influenza with the Oak Ridge Bio-surveillance Toolkit.” *Frontiers in Public Health* 3, no. 1, 1-12, (2015).

Ramanathan, Arvind, Laura Pullum, et al. “ORBiT: Oak Ridge Bio-surveillance Toolkit for Public Health Dynamics.” *BMC Bioinformatics* 16, (2015).

Ramanathan, Arvind, Laura Pullum, et al. “Discovery of Disease Co-occurrence Patterns from Electronic Healthcare Reimbursement Claims Data.” In *Knowledge Discovery and Data Mining Big Data in Health Informatics* (KDD-BHI), 2014.

Corley, Courtney D, Pullum, Laura L, Hartley, David M, Benedum, Corey, Noonan, Christine, Rabinowitz, Peter M, & Lancaster, Mary J. (2014). Disease Prediction Models and Operational Readiness. *PloS one*, 9(3), e91989.

Pullum, Laura, & McKinney, Michael L. (2014). “Abrasion from dam release does not affect mortality in a freshwater mussel,” North American Paleontological Convention (NAPC), Gainesville, FL. February 16, 2014.

Pullum, Laura L., & Michael L. McKinney. “Hierarchical Agglomerative Clustering for Delimiting Veneridae Species” Geological Society of America Annual Meeting, Denver, CO, Oct. 2013, In *Geological Society of America Abstracts with Programs*.

Ramanathan, Arvind, Pullum, Laura L, Steed, Chad A, Parker, Tara L, Quinn, Shannon P, & Chennubhotla, Chakra S. (2013). Oak Ridge Bio-surveillance Toolkit (ORBiT): Integrating Big-Data Analytics with Visual Analysis for Public Health Dynamics. In *Public Health's Wicked Problems: Can InfoVis Save Lives?* 2013.

Steed, Chad A, Potok, Thomas E, Pullum, Laura L, Ramanathan, Arvind, Shipman, Galen, & Thornton, Peter E. (2013). Extreme Scale Visual Analytics. In *4th SC Workshop on Petascale (Big) Data Analytics,* 2013.

Pullum, Laura, & Ramanathan, Arvind. ORBiT–The Oak Ridge Biosurveillance Toolkit. *IDIS* 2013.

Ramanathan, Arvind, Pullum, Laura L, Steed, Chad A, Quinn, Shannon S, Chennubhotla, Chakra S, & Parker, Tara. (2013). Integrating heterogeneous healthcare datasets and visual analytics for disease bio-surveillance and dynamics. *IEEE Workshop on Interactive Visual Text Analytics* (Atlanta, GA).

Corley, Courtney D, & Pullum, Laura. (2013). Disease models for event prediction. *Online Journal of Public Health Informatics*, 5(1).

Pullum, Laura L., and Ozgur Ozmen. “Early Results from Metamorphic Testing of Epidemiological Models.” In *Workshop on Verification and Validation of Epidemiological Models (VVEM-2012), ASE International Conference on BioMedical Computing*, 62-67, December 2012.

Corley, Courtney and Laura L. Pullum. “Disease Models for Event Prediction.” 2012 International Society for Disease Surveillance (ISDS) Annual Conference, San Diego, California, USA, December 04-05, 2012.

Ramanathan, Arvind, Chad A. Steed and Laura L. Pullum. “Verification of Compartmental Epidemiological Models using Metamorphic Testing, Model Checking and Visual Analytics.” In *2012 Workshop on Verification and Validation of Epidemiological Models As part of 2012 ASE/IEEE International Conference on Biomedical Computing,* 68-73, 2012.

Pullum, Laura L. and Xiaohui Cui. “A Hybrid Sensitivity Analysis Approach for Agent-based Disease Spread Models.” In *DSN (Dependable Systems and Networks)*, June 2012.

Pullum, Laura L., and Xiaohui Cui. “Techniques and Issues in Agent-Based Modeling Validation.” In *DSN (Dependable Systems and Networks)*, June 2012.

Rouff, Christopher, L. Pullum, et al., “The AdaptiV Approach to Verification of Adaptive Systems.” In Fifth International C* Conference on Computer Science & Software Engineering (C3S2E’12), April 2012.

Pullum, Laura L., C. Rouff, R. Buskens, X. Cui, E. Vassiv, and M. Hinchey, “Verification of Adaptive Systems,” *AIAA Infotech@Aerospace 2012*, April 2012.

Pullum, Laura L., and Michael L. McKinney, “Biological Homogenization of Freshwater Mussels from Human Activities,” Geological Society of America Southeastern Section - 61st Annual Meeting, Ashville, NC, April 2012, In Geological Society of America *Abstracts with Programs*, Vol. 44, No. 4, p. 16.

Pullum, L., and C. Symons, “Failure Analysis of a Complex Learning Framework Incorporating Multi-Modal and Semi-Supervised Learning,” In *IEEE Pacific Rim International Symposium on Dependable Computing (PRDC 2011),* 308-313, 2011.

Brettin, Thomas S., X. Cui, L. Pullum, et al., “A Novel Architecture for Biothreat Situation Awareness.” *Supercomputing*, Seattle, WA, Nov. 14-18, 2011.

Brettin, Thomas S., Laura Pullum, et al., “Enhanced Data Analytics and Decision Support for Biothreat Situation Awareness.” *DTRA CBD S&T Conference*, Las Vegas, Nevada, Nov., 2011.

Pullum, L.L., C. Symons, et al., “Architecture-Level Dependability Analysis of a Medical Decision Support System.” *International Conference on Software Engineering (ICSE) Workshop on Software Engineering in Health Care*. SEHC’10. Cape Town, South Africa. May 2010.

Haglich, P., C. Rouff, and L. Pullum, “Detecting Emergent Behaviors with Semi-Boolean Algebra,” *Proceedings of AIAA Infotech @ Aerospace*, 2010.

Darrah, Margie, Laura Pullum, et al., “Using Genetic Algorithms for Robust Tasking of Multiple UAVs with Diverse Sensors,” *Proceedings of AIAA Infotech @ Aerospace*, 2009.

Cui, Xiaohui, Laura Pullum, et al., “A Stigmergy Approach for Open Source Software Developer Community Simulation.” In *Symposium on Social Computing Applications (SCA09)*, 2009.

Cui, Xiaohui, Laura Pullum, et al. “A Stigmergy Collaboration Approach in the Open Source Software Developer Community.” In *Human Behavior-Computational Intelligence Modeling Conference*, 2009.

Cui, Xiaohui, Laura Pullum, et al., “Particle Swarm Social Model for Group Social Learning in Adaptive Environment.” In *Social Computing, Behavioral Modeling, and Prediction,* 141-150, New York, NY: Springer, 2008.

Pullum, L. L., Marjorie A. Darrah, and Brian J. Taylor, "Independent Verification and Validation of Neural Networks – Developing Practitioner Assistance," *Software Tech News*, July, 2004.

Pullum, L. L., M. Darrah, S. Skias, K. Tso, and A. Tai, "Developing a Data-Driven Prognostic System with Limited System Information," *Proceedings of the Eighth IEEE International Symposium on High Assurance Systems Engineering (HASE)*, Tampa, FL, March 25-26, 2004.

Pullum, L. L., "Software Fault Tolerance – Techniques and Processes," invited seminar for Boeing, Seattle, WA, June 4, 2003.

Pullum, L. L., "Tutorial: Software Fault Tolerance," Digital Avionics Systems Conference, 1999, 2000, 2001.

Duncan, R. V., Jr., and L. L. Pullum, "Object-Oriented Executives and Components for Fault Tolerance," *IEEE Aerospace Conference*, Big Sky, Montana, Mar. 2001.

Pullum, L. L., "Tutorial: Software Testing," Annual Reliability and Maintainability Symposium, 1997, 2000.

Pullum, L. L., "Tutorial: Software Fault Tolerance," Annual Reliability and Maintainability Symposium, 1998, 1999.

Pullum, L. L., and J.B. Dugan, "Software-Design Risk Identification and Mitigation using ShadeTree," *Proceedings: Reliability and Maintainability Symposium*, pp. 162-169, Jan. 1998.

Pullum, L. L., "Tutorial: Fault-Tolerant Software," International Symposium on Software Reliability Engineering, 1996, 1997.

Dugan, J. B., S. A. Doyle, and L. L. Pullum, "New Approaches to Fault Tree Analysis," *SAE Communications in Reliability, Maintainability, Supportability and Logistics*, 1996.

Pullum, L. L., and Joanne Bechta Dugan, "Fault Tree Models for the Analysis of Complex Computer-Based Systems." *Annual Reliability and Maintainability Symposium*, Las Vegas, NV, Jan. 1996. [Winner, P.K. McElroy Award for Best Paper]

Pullum, L. L., R. J. Dziegiel, Jr., J. S. Yalowitz, and M. J. Ray, "Reusable Templates for Incorporating Software Fault Tolerance into System Designs," *AIAA Computing in Aerospace 10 Conference*, San Antonio, TX, Mar. 28-30, 1995.

Wakefield, G. S., R. Dziegiel, Jr., and L. L. Pullum, "Centurion Software Fault Tolerance Design and Analysis Tool," *COMPASS '94*, Gaithersburg, MD, pp. 93-100, Jun. 27-Jul. 1, 1994.

Pullum, L. L., R. Dziegiel, Jr., and G. S. Wakefield, "Templates for Software Fault Tolerant Voting on Results of Floating Point Arithmetic," *Proceedings: AIAA Computing in Aerospace*, Oct. 1993. (San Diego, CA).

Pullum, L. L., "A New Adjudicator for Fault Tolerant Software Applications Resulting in Multiple Solutions," Proceedings: *IEEE/AIAA Digital Avionics Systems Conference*, pp. 147-152, Oct. 1993. (Ft. Worth, TX).

Pullum, L. L., N. Geddes, and M. Hoffman, "Intelligent Interfaces in Command and Control," Proceedings: *C3I Technology and Applications Conference* (Utica, NY), 1-4 Jun. 1992.

Pullum, L. L., "Automated Fault Tolerance Evaluator for System Design, Simulation, and Analysis," *Proceedings of the Digital Avionics Systems Conference* (Virginia Beach, VA), 15-18 Oct. 1990.

Wakefield, G. S., and L. L. Pullum, "An Object-Oriented Simulation Tool to Assist Knowledge Base Development," *Applications of Artificial Intelligence in Engineering V*, (Vol. 2:

Manufacture and Planning) Ed. G. Rzevski, Boston and New York: Computational Mechanics Publications and Springer-Verlag, pp. 361-371, 1990.

Pullum, L. L., "Application of Tie-Set Analysis to Fault Tolerant Software Design," *Computer Applications in Design, Simulation, and Analysis*, Ed. E.K. Park, Anaheim, CA: ACTA Press, pp. 136-139, 1990.

Pullum, L. L., and J. Yalowitz, "Automated Fault Tolerance Evaluator for Real-Time System Development," *Conference on Methodologies and Tools for Real-Time Systems*, National Institute for Software Quality and Productivity, Washington, D.C., 17-18 Jul. 1989.

Geveden, R., C. Nail, L. L. Pullum, et al., "Creating Domain Knowledge for Strategic Command and Control Decision Aids," *Conference for Strategic Systems*, 1989.

Nail, C., Geveden, R., Pullum, L. L., et al., "The Nature of Command and Control Decision Aid Evidence in Strategic Defense," *Second Annual Conference for Strategic Systems*, Huntsville, AL, 1988.

RESEARCH REPORTS

Lewis, C., K. Bjork, C. Carson, L. Hungerford, B. Karp, C. Lanzas, L. Pullum, M. Stanhope, V. Volkova, and Y. T. Gröhn. *A Proposed Analytic Framework for Determining The Impact of an Antimicrobial Resistance Intervention at the National Level*. NIMBioS Working Group report. 2016.

Pullum, Laura L. *Phase II Report: Verification, Validation, and Uncertainty Quantification for Predictive Systems.* ORNL/TR-2016. Oak Ridge, TN: Oak Ridge National Laboratory. 2016.

Pullum, Laura L. *eScore Test Plan*. ORNL/TR. Oak Ridge, TN: Oak Ridge National Laboratory. 2016.

Pullum, Laura L. *eScore Test Procedures*. ORNL/TR. Oak Ridge, TN: Oak Ridge National Laboratory. 2016.

Pullum, Laura L. *eScore Test Report*. ORNL/TR. Oak Ridge, TN: Oak Ridge National Laboratory. 2016.

Pullum, Laura L. and Arvind Ramanathan. *Quantitative Approaches to Verify and Validate Anomaly Detection Algorithms.* ORNL/LTR-2015/589. Oak Ridge, TN: Oak Ridge National Laboratory. 2015.

Pullum, Laura L., "Survival and Growth Rate of Translocated Freshwater Mussels *Lampsilis fasciola* and *Medionidus conradicus*," Masters Thesis, University of Tennessee, Earth and Planetary Sciences Department, 2015.

Wood, Richard Thomas, Laura Pullum, et al. *Taxonomy for Common-Cause Failure Vulnerability and Mitigation.* ORNL/SPR-2015/209. Oak Ridge, TN: Oak Ridge National Laboratory. 2015.

Pullum, Laura L. and Arvind Ramanathan. *Demonstrating a Novel Bio-defense Capability using Public Health Data Informatics.* LDRD Report. Oak Ridge, TN: Oak Ridge National Laboratory. 2014.

Wood, Richard Thomas, Laura Pullum, et al. *Update on Common-Cause Failure Experience and Mitigation Practices.* ORNL/TM-2013/563. Oak Ridge, TN: Oak Ridge National Laboratory. 2013.

Pullum, Laura L., et al. *Verification and Validation of Agent-Based Disease Spread Models - Year 1 Report.* ORNL/TM-2013/304. Oak Ridge, TN: Oak Ridge National Laboratory. 2013.

Pullum, Laura L. *Evaluating the ORCA Classifier – Requirements, Approach, and Open Issues.* ORNL/TM-2010/337. Oak Ridge, TN: Oak Ridge National Laboratory. 2010.

Beckerman, Barbara G., L. Pullum, et al. *Data Analytics for Medicine Using Semi-Supervised Learning.* LDRD Report. Oak Ridge, TN: Oak Ridge National Laboratory. 2010.

Pullum, L. L., Darrah, Marjorie, Skias, Spiro, Tso, Kam, and Ann Tai, "Library and Architecture for Implementing Data Driven Prognostics – Final Report," IA Tech, Inc. and Institute for Scientific Research, Inc., Fairmont, WV, for Missile Defense Agency, Feb. 25, 2004.

Yalowitz, Jeffrey S., Michael H. Whitten, Andrew G. Schooley, Laura L. Pullum, and Ralph V. Duncan, "SBIR Phase I Final Report: Reliable Distributed-Object Computing with Fault-Tolerant Cooperative Intelligent Agents," for National Science Foundation, July 1999.

Pullum, Laura L., and Ralph V. Duncan, "Fault-Tolerant Object-Oriented Code Generator: Phase I Final Report," Technical Report, for NASA Ames Research Center, June 1999.

Pullum, Laura L., and Ralph V. Duncan, "Code Structure and Comments for Usability for the Fault-Tolerant Object-Oriented Code Generator," Quality Research Associates Technical Note, for NASA, June 1, 1999.

Daniel, B., J. Yalowitz, M. Whitten, P. Snell, J. Montgomery, Laura L. Pullum, Ralph Duncan, S. Wakefield, and D. Shelton, "Final Report for Fault-Tolerant Cooperative Intelligent Agent Systems for Distributed C3I," Sentar Technical Report, Rome Laboratory Contract, May, 1999.

Pullum, Laura L., and Ralph V. Duncan, "Fault-Tolerant Object-Oriented Code Generator: Automated Code Generation Feasibility," Quality Research Associates, Technical Report, for NASA, 15 Mar. 1999.

Pullum, Laura L., and Ralph V. Duncan, "End-to-End Fault-Tolerant Application Development System: System Description Document," Technical Report, for NASA, 31 Jan. 1999.

Pullum, L. L., "Data Diverse Software Fault Tolerance Techniques for C3I Technologies: Technique Notebook," Technical Report, Air Force Rome Laboratory Contract, Nov. 1997.

Pullum, L.L., "Data Diverse Software Fault Tolerance Techniques for C3I Technologies: Phase II Final Report," Quality Research Associates Technical Report, Nov. 1997. (Air Force Research Laboratory, Rome Site, Technical Report Number AFRL-IFRF-TR-1998-8, March, 1998).

Pullum, L. L., "Design Fault Risk Identification and Mitigation: Phase I Final Report," Quality Research Associates Technical Report, QRA-DFRIM-FTR-01, for NASA, Sep. 1997.

Yalowitz, J., L.L. Pullum, R.V. Duncan, G.S. Wakefield, and R. Daniel, "Fault-Tolerant Cooperative Intelligent Agent Systems for Distributed C3I: Final Technical Report," SENTAR Technical Report, Rome Laboratory Contract F30602-96-C-0129, Dec. 1996.

Pullum, L. L., and Joanne B. Dugan, "Advanced Dynamic Fault Tree Analysis Techniques for Complex Systems Dependability Analysis: Phase I Final Report," Tech. Report, National Science Foundation Grant, Aug. 1995.

Pullum, L. L., and Joanne Bechta Dugan, "Dynamic Fault Tree Analysis Methodology Examples," Technical Report, National Science Foundation Grant, QRA-TR-95-05, Jul. 1995.

Pullum, L. L., and Joanne Bechta Dugan, "Risk Levels and Fault Tree Analysis," Quality Research Associates Technical Report, National Science Foundation Grant, Jun. 1995.

Pullum, L. L., and Joanne Bechta Dugan, "Fault Tree Analysis Methodology to Include Assessment of Hardware, Software, Humanware, and Environmental Influences," Quality Research Associates Technical Report, National Science Foundation Grant, May 1995.

Pullum, L. L., and Joanne Bechta Dugan, "Modularization and Synthesis Techniques for Fault Tree Analysis," Technical Report, National Science Foundation Grant, Apr. 1995.

Pullum, Laura L., "Data Diverse Software Fault Tolerance Techniques for C3I Technologies: Final Report," Technical Report, RL-TR-95-15, Rome Laboratory Contract, Feb. 1995.

Pullum, L. L., "Data Diverse Software Fault Tolerance Techniques for C3I Technologies: Final Report," Quality Research Associates Technical Report, QRA-TR-94-10, Dec. 1994.

Pullum, L. L., C. Friedlander, and C. Channell, "IWSDB Prototype Final Report," ISX Corporation, Integrated Weapon System Data Base Contract (ARPA), Apr. 1993.

Pullum, L. L., "Software Fault Tolerant Means of Voting on Results of Floating Point Arithmetic," TN1, for Rome Laboratory, Jan. 1993.

Pullum, L. L., "Fault Tolerant Software Decision-Making Under the Occurrence of Multiple Correct Results," Doctoral Dissertation, Southeastern Institute of Technology, Systems Engineering and Operations Research, Aug. 1992.

Wakefield, G. S., L. L. Pullum, and M. Schroer, "Computer Aided Software Fault Tolerance System Development," RL-TR-92-203, Jul. 1992.

Pullum, L. L., D. Darnell, and G. S. Wakefield, "C2 Wargame and Simulation Exercise Operational Requirements Review," Tech. Report, MDA Contract, 28 Feb. 1991.

Pullum, L. L., "Fault Tolerant System Design and Evaluation Algorithms: Final Report," Technical Report, for Naval Surface Warfare Center (U33), White Oak Laboratory, Oct. 1990.

Pullum, L. L., "Recent Advances in R&D Project Selection Techniques," Masters Thesis, Southeastern Institute of Technology, MBA, 1990.

Pullum, L. L., "Techniques and Measures of Software Reliability and Fault Tolerance," Fault Tolerant System Design and Evaluation Algorithms contract, for Naval Surface Warfare Center, Technical Report, SRS Technologies, 1989.

Pullum, L. L., "CARAP: A Cost and Reliability Analysis Program," Masters Thesis, University of Alabama in Huntsville, Industrial and Systems Engineering Department, 1987.

Pullum, L. L., J. Yalowitz, and J. Morrison, "Phase I Final Report for Fault Tolerant Design and Evaluation Algorithms SBIR (NSWC)," SRS Technologies, 1987.

SELECTED HONORS AND AWARDS

- Employee of the Quarter, Computational Sciences and Engineering Division, ORNL, 2014
- Distinguished Employee, Computing & Computational Sciences Directorate, ORNL, 2012
- Business development awards, Institute for Scientific Research, 2003-2006
- P.K. McElroy Award for Best Paper, 1996 Reliability and Maintainability Symposium for "Fault Tree Models for the Analysis of Complex Computer-Based Systems"
- SRS Technologies employee of the Month, Nov. 1989, June 1991
- Presidential Award for Outstanding Master's Project, Southeastern Inst. of Technology, 1990

TECHNICAL COMMUNITY

- Organizations: Senior member of IEEE (Institute of Electrical and Electronics Engineers), AIAA, Geological Society of America (GSA), Mensa, Paleontological Society
- Organizing Committee: Metamorphic Testing (MET), ICSE 2016. (International Computer and Software Engineering Symposium.
- Reviewer for: *IEEE Computer*, John Wiley & Sons, Springer, *Software Reliability Eng. Case Studies* (ISSRE), *IEEE Trans. on Software Eng.*, *IEEE Trans. on Reliability*, *Innovations in Systems and Software Engineering*, and several conferences
- National Science Foundation (NSF): review panel member for the Information Technology Research (ITR) Program, Division of Information and Intelligent Systems (IIS), Directorate of Computer and Information Science and Engineering (CISE), 2005
- Program committees: High Assurance Systems Engineering (HASE) symposium, 2004-2005; ISHM 2011; Software Health Management (2011); ASONAM 2011-2016; Dependable Systems and Networks (DSN) Fast Abstracts 2012; FMSAS 2012; SIGKDD (2012)
- Program Chair: Verification & Vaidation of High Performance Computing, in Supercomputing, 2013
- Panels and Advisory Boards: Women in Cybersecurity (WiCys) advisory board (2013-2015); Pacific Rim Dependability Conference, Panel - Many Levels of Fault Management: Perspectives from the Software Level (2011)
- Workshops: Verification & Validation of High Performance Computing at Supercomputing 2010, New Orleans, LA; Computational Methods for Biosurveillance at Supercomputing 2011, Seattle, WA; 2nd Intl Workshop on Software Health Management 2011; SIGKDD Workshop on Health Informatics 2012; Software Engineering Workshop (SEW) 2012, 2016
- Standards Working Group: IEEE Std 1012-2012, *Standard for System Verification and Validation*, 2004-present