

Dr. Paul W. Oman**Professor and Past-Chair of Computer Science, University of Idaho**

Department of Computer Science, University of Idaho, Moscow, Idaho, 83843

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ADMINISTRATIVE EXPERIENCE:

Director, National Science Foundation CyberCorps, University of Idaho, 2002-present
Senior Research Engineer, Schweitzer Engineering Labs, Pullman, WA, 2000-2002
Chair, Department of Computer Science, University of Idaho, 1997-2000
Hewlett-Packard Engineering Chair, College of Engineering, U. of Idaho, 1993-2000
Director, Software Engineering Test Lab, College of Engineering, U. of Idaho, 1990-2000
Cooperative Education Coordinator, Computer Science Dept., Oregon State U., 1986-1988
Computer Center Director, Eastern Oregon State College, 1983-1984
Director, Office of Institutional Research, Eastern Oregon State College, 1983-1984
Director, Summer Computer Camp, Eastern Oregon State College, 1983-1984
Systems Analyst, Milne Computer Center, Oregon State University, 1979-1981
President, Total Recall Technology, Inc., Corvallis, Oregon, 1978-1981

AWARDS and HONORS:

Outstanding Faculty Award, University of Idaho Computer Science Students, May 2004.
Best Paper Award, *Georgia Tech Protective Relaying Conference*, May 2001.
Elected to Senior Member status, Institute of Electrical and Electronics Engineers, 2001
University Excellence in Research Award, University of Idaho, May 2000.
Phi Kappa Phi Distinguished Professor Award, UI Phi Kappa Phi Chapter, May 1998.
Faculty Excellence Award, Naval ROTC Unit, University of Idaho, May 1997.
Outstanding Faculty Award, College of Engineering, University of Idaho, May 1994.
Selected as the HP Engineering Chair, Hewlett-Packard Boise Printer Division, 1993-99.
Outstanding Teacher Award, University of Idaho ACM Student Chapter, May 1993.
Appointed to the editorial board of *IEEE Computer* as Theme Issues Editor, effective Jan. 1993.
Voted Best Speaker, Hewlett-Packard Software Maintenance Practitioner's Forum, March 1992.
Invited as a software engineering expert on a U.N. mission to Bangalore, India, July 1991.
Appointed to the editorial board of the *Software Quality Journal*, May 1991.
Invited as Tools Fair Chair, IEEE Conf. on Software Maintenance, San Diego, CA, Nov. 1990
Appointed Associate Editor-in-Chief, *IEEE Software*, 1990-91
Invited expert opinion essay, *IEEE Spectrum* special issue on technology, Feb. 1990
Executive Board Service Award, Northwest Council for Computer Education, Feb. 1989
Senior Referee Award, *IEEE Software*, Dec. 1988
Editorial Board Service Award, *IEEE Software*, Dec. 1987
Alumni Award for Faculty Excellence, University of Idaho, Dec. 1986
Service commendation, Society of American Foresters, Mar. 1983
Service commendation, National University Continuing Education Association, Oct. 1982
Phi Kappa Phi Honor Society (life member, first nominated in 1975)

EMPLOYMENT HISTORY:

07/98 – present Full Professor, Computer Science, University of Idaho

Research and teaching focused on Information Assurance (IA), Real-time Control Systems (RTCS), and Supervisory Control and Data Acquisition (SCADA) systems. Director of the NSF CyberCorps program (\$3.4M) and researcher in the Center for Secure and Dependable Systems (CSDS; \$2.3M).

07/00 – 07/02 Senior Research Engineer, Schweitzer Engineering Labs, Pullman, WA
Responsible for communications equipment design and prototyping, security and survivability analyses of SCADA systems, and improving engineering R&D procedures for networked real-time control systems with protective relays and communications processors.

07/97 – 06/00 Chair, Department of Computer Science, University of Idaho
Responsibilities include coordination of all undergraduate and graduate instruction in computer science at the Moscow and Idaho Falls campuses, budget management (approx. \$1M state funds and \$1.5M research), supervision of department staff, and allocation of resources. Continuing responsibilities for research in software engineering, software complexity, and programmer productivity.

06/91 – 07/98 Associate Professor, Computer Science, University of Idaho

08/84 - 05/91 Assistant Professor, Computer Science, University of Idaho

Responsibilities include upper division and graduate instruction in computer science and research in the areas of software engineering, software complexity, and programmer productivity.

07/88 - 12/88 Visiting Assistant Professor, Computer Science, Oregon State University

09/85 - 06/86

Conducted research in the areas of software engineering, human factors, computer science education, and mathematical models of cognition. Coordinated the CS Dept. cooperative education program and served as advisor to graduating seniors.

12/83 - 8/84 Computer Center Director, Eastern Oregon State College

Director, Office of Institutional Research, Eastern Oregon State College

As the director of the EOSC Computer Center and the Office of Institutional Research, responsibilities included administrative and instructional data processing for the college. Supervision of a staff of five full-time and six part-time employees.

09/81 - 8/84 Assistant Professor, Computer Science, Eastern Oregon State College

Designed and implemented a baccalaureate program in Computer Science. Responsible for the organization of that program and instruction in computer science in addition to teaching computer literacy and special topics in computer science. Also served as a consultant to the faculty and administration in regards to data processing matters.

01/79 - 9/81 Systems Analyst, Milne Computer Center, Oregon State University

As technical specialist on data base management systems, responsible for design, implementation, analysis, and maintenance of data systems used by various state and federal government agencies.

- 01/78 - 12/78 Programmer/Analyst, Milne Computer Center, Oregon State University
Primary responsibilities were faculty training and applications programming support, also preparing and conducting faculty workshops on programming languages and applications.
- 06/77 - 12/77 Programmer/Consultant, Milne Computer Center, Oregon State University
The main purpose of the position was to interact with students, staff, and faculty on a wide variety of programming jobs. The role of a consultant called for general programming and trouble-shooting skills.
- 09/75 - 12/77 Graduate Teaching Assistant, Psychology, Oregon State University
Teaching courses in general psychology required lecturing, testing, and grade assignment to undergraduate students. Other responsibilities included assisting with courses in experimental psychology and workshops on human adjustment.
- 1971 - 1974 Laboratory Aide, USDA Research Station, Oregon State University
Duties included care of laboratory plants, greenhouse maintenance and assisting on experiments in plant virology.

GRANTS RECEIVED (as PI or co-PI):

- J. Alves-Foss & P. Oman, Wind River Coding Guidelines Analysis, Wind River, Inc., \$53,400, 2007.
- A. Abdel-Rahim, P. Oman, & B. Johnson, *A Framework to Assess the Survivability of Intelligent Transportation Systems*, Federal Highway Administration UTC Program, \$107,116, 2006-2007.
- P. Oman, J. Alves-Foss, & C. Taylor, *Cyber Service Training and Education Continuation*, National Science Foundation, \$824,065, 2006-2009.
- A. Abdel-Rahim, P. Oman, & B. Johnson, *Modeling and Assessing Large-scale Transportation Network Component Criticality*, Federal Highway Administration UTC Program, \$95,169, 2005-2006.
- J. Alves-Foss, P. Oman, & S. Harrison, *MILS Embedded Systems*, DARPA, \$1,200,000, 2004-2006.
- A. Abdel-Rahim, P. Oman, & B. Johnson, *Experiments in Modeling Urban Surface Transportation Network Dependability and Security*, Federal Highway Administration UTC Program, \$58,466, 2004-2005.
- P. Oman, *RADICL – a Reconfigurable Attack/Defend Instructional Computing Laboratory*, NSF Division for Undergraduate Education, \$120,941, 2004-2006.
- P. Oman & B. Johnson, *Survivable Power Systems for Hostile Environments*, NASA ISGP Seed Grant, \$4,000, 2004.
- P. Oman, *Cyber Service Training and Education Internship Supplement*, National Science Foundation, \$39,000, 2004.
- J. Alves-Foss, P. Oman, & S. Harrison, *Theoretical Foundations of MILS CORBA Middleware*, DARPA, \$1,083,000, 2003-2004.
- A. Krings & P. Oman, *Applying Safety Critical Fault Tolerant Principles to Survivable Transportation Control Networks*, Federal Highway Administration UTC Program, \$90,855, 2003-2004.

- B. Hiromoto & P. Oman, *Educational Outreach in Information Assurance and Network Security*, Idaho National Environmental and Engineering Laboratory, \$148,000, 2003-2004.
- P. Oman, *Cyber Service Training and Education Internship Supplement*, National Science Foundation, \$30,000, 2003.
- P. Oman, J. Alves-Foss, D. Frincke, & R. Lewis, *Cyber Service Training and Education Supplement*, National Science Foundation, \$1,212,578, 2002-2005.
- P. Oman, E. Schweitzer, J. Alves-Foss, A. Krings, A. Bose, & D. Bakken, *Industrial Applications of Information Security to Protect the Electric Power Infrastructure*, National Institute of Standards and Technology, \$948,000, 2001-2003.
- B. Hiromoto, G. Hura, & P. Oman, *Educational Outreach Activities in Information Assurance*, Idaho National Environmental and Engineering Laboratory, \$143,000, 2002-2003.
- J. Alves-Foss & P. Oman, *Feasibility and Planning Study for the Design, Specification, and Verification of MILS CORBA Middleware*, Lockheed-Martin Aeronautics, \$119,069, 2002-2003.
- P. Oman & A. Krings, *Assessing the Security and Survivability of Transportation Control Networks*, Federal Highway Administration UTC Program, \$32,699, 2002-2003.
- P. Oman, J. Dickinson, J. Alves-Foss, D. Frincke, & D. Tobin, *Center for Academic Excellence in Information Assurance Education*, National Security Agency Center of Excellence (COE) designation, 1999-present.
- J. Alves-Foss & P. Oman, *A Life-Cycle Based Engineering Approach to the Design and Implementation of Reliable Software Systems*, Army Research Office, DOD-DEPSCOR, \$257,175, 1999-2002.
- A. Krings & P. Oman, *Reliability, Security, and Survivability in Distributed Computing Systems*, Idaho National Environmental and Engineering Laboratory, \$159,250, 2000-2001.
- P. Oman & D. Frincke, *Traffic Analysis and Internet Security Investigations*, Schweitzer Engineering Labs, \$64,000, 1999-2000.
- P. Oman, J. Alves-Foss, D. Frincke, & A. Krings, *Information Security and Reliable Computing*, Idaho National Environmental and Engineering Laboratory, \$175,323, 1999-2000.
- P. Oman, J. Alves-Foss, & D. Frincke, *Cyber Security*, Governor's Initiative Award, Idaho SBOE, \$222,000, 1999.
- P. Oman, *MS Windows Networking Laboratory* (software), Microsoft, \$50,000, 1999.
- P. Oman, *MS Windows Networking Laboratory* (equipment), Hewlett-Packard, \$91,870, 1998.
- J. Munson, J. Alves-Foss, D. Frincke, & P. Oman, *Measuring System Dynamics for the Direct Assessment of Software Security Violations*, NSF, \$140,000, 1998-2000.
- P. Oman, J. Alves-Foss, & D. Frincke, *Computer Network and Information Security*, DOD, \$500,000, 1998.
- P. Oman, *Software Maintainability Metrics*, Bell Northern Research, \$20,000, 1997.
- P. Oman, *Software Maintainability Metrics*, Microsoft, \$10,000, 1997.
- P. Oman, *Software Quality and Maintainability Metrics*, Hewlett-Packard, \$195,000, 1997-2000.
- P. Oman, Research Equipment Grant, Hewlett-Packard, \$4,485, 1996.
- P. Oman & J. Munson, *Software Maintainability Metrics*, Bell Northern Research, \$20,000, 1996.
- P. Oman, *Software Quality Metrics*, INEL/LITCO, \$4,204, 1995.
- P. Oman, Research Travel Grant, AWU/DOE, \$674, 1995.
- P. Oman, *Software Quality Metrics*, Idaho SBOE, \$32,230, 1994.
- P. Oman, *Software Quality Metrics*, Hewlett-Packard, \$195,000, 1993-1996.

- P. Oman, Research Software Grant, Set Labs, Inc., \$60,399, 1993.
- P. Oman, Research Travel Grant, U.I. Research Office, \$900, 1993.
- P. Oman, Software donations from CASE tool distributors, \$3,395, 1993.
- P. Oman, *Software Quality Metrics*, Hewlett-Packard, \$26,767, 1992.
- P. Oman, Research Equipment Grant, Hewlett-Packard, \$93,254, 1991.
- P. Oman, Research grant from First Step Research, \$12,000, 1991.
- P. Oman, *Software Quality Metrics*, Hewlett-Packard, \$44,078, 1991.
- P. Oman, *Software Quality Metrics*, U.I. Research Office, \$6,000, 1991
- P. Oman, Research Travel Grant, U.I. Research Office, \$600, 1991.
- P. Oman, J. Kulas, & J. Dickinson, Curriculum Development Grants, U.I. Honors Program & GTE, \$4,900, 1991.
- P. Oman, Research Equipment Grant, Hewlett-Packard, \$1,500, 1990.
- P. Oman, Software donations from CASE and CAD tool distributors, \$3,310, 1990.
- P. Oman, Software donation, Popkin Software, \$1,395, 1990.
- P. Oman, Software donation, StructSoft, Inc., \$1,990, 1990.
- P. Oman, Travel Grant, IEEE Computer Society, \$1,100, 1990.
- P. Oman, Research Equipment Grant, Apple Computer, Corp., \$6,944, 1990.
- P. Oman, Research Equipment Grant, Extended Systems, Inc., \$345, 1990.
- P. Oman, Software donation, Starsys, Inc., \$1,590, 1989.
- P. Oman, Research Travel Grant, U.I. Research Office, \$600, 1989.
- P. Oman & W. Junk, Software donation, KnowledgeWare, Inc., \$17,250, 1988.
- P. Oman, Research Grants, O.S.U. Computer Science Dept., \$1,080, 1986-1988.
- P. Oman, Curriculum Development Grant, E.O.S.C. Continuing Education Office, \$2,990, 1982-1984.

PUBLICATIONS:

Books and Special Issues.

1. P. Oman & M. Phillips, "Intrusion Detection and Event Monitoring in SCADA Networks," Chapter 12 in *Critical Infrastructure Protection*, (E. Goetz & S. Sheno, eds.) Springer, New York, NY, 2007, pp. 161-174.
2. P. Oman & S. Pfleeger, *Applying Software Metrics*, IEEE Computer Society Press, Los Alamitos, CA, 1996, 321 pages.
3. T. Khoshgoftar & P. Oman (editors), "Metrics in Software," a special theme issue of *IEEE Computer*, Vol. 27(9), Sept. 1994, 128 pages.
4. K. Nichols & P. Oman (editors), "Software for Performance Analysis," a special theme issue of *IEEE Software*, Vol. 8(5), Sept. 1991, 112 pages.
5. T. Lewis & P. Oman (editors), "Software Challenges for the 1990's," a special theme issue of *IEEE Software*, Vol. 7(6), Nov. 1990, 112 pages.
6. P. Oman & T. Lewis (editors), "Software Tools Fair," a special theme issue of *IEEE Software*, Vol. 7(3), May 1990, 120 pages.
7. P. Oman & T. Lewis, *Milestones in Software Evolution*, IEEE Computer Society Press, Los Alamitos, CA, 1990, 332 pages.

Refereed Journal/Magazine Papers.

1. D. Conte de Leon, P. Oman, and ???, "A formal approach to defining, determining, and visualizing implementation components and traceability relationships of a system

- model," submitted to the *Journal of Software Maintenance and Evolution*, in review Fall 2007.
2. P. Cravens & P. Oman, "Modeling ATCS Networks Using the NS-2 Simulator," submitted to the *IEEE Transactions on Vehicular Technology*, in review Fall 2007.
 3. A. Abdel-Rahim, P. Oman, B. Johnson, and L. Tung, "Survivability Analysis of Large Scale Intelligent Transportation System Networks," accepted by the *Transportation Research Record: Journal of the Transportation Research Board*, No. 2022, TRB of the National Academies, Washington, D.C., 2007, pp. 9-20.
 4. M. Benke, A. Abdel-Rahim, P. Oman, and B. Johnson, "Case Study of a Survivability Analysis of a Small Intelligent Transportation System," *Transportation Research Record: Journal of the Transportation Research Board*, No. 1944, TRB of the National Academies, Washington, D.C., 2006, pp. 98-106.
 5. S. Butapati, R. Kalidindi, M. Benke, A. Abdel-Rahim, P. Oman & B. Johnson, "A Case Study of Critical Point Identification in the Physical and Communication Layers of a Small Urban Transportation System," *International Journal of Critical Infrastructures*, Vol. 2(4), 2006, pp. 319-330.
 6. J. Alves-Foss, W. S. Harrison, P. Oman and C. Taylor, "The MILS Architecture for High-Assurance Embedded Systems," *International Journal of Embedded Systems*, Vol. 2(3/4), 2006, pp. 239-247.
 7. N. Hanebutte & P. Oman, "Software Vulnerability Mitigation as a Proper Subset of Software Maintenance," *Journal of Software Maintenance and Evolution*, Vol. 17, 2005, pp. 379-400.
 8. J. Conrad, P. Oman, and C. Taylor, "Managing Uncertainty in Security Risk Model Forecasts with RAPSA/MC," *Security Management, Integrity, and Internal Control in Information Systems*, S. Furnell, et al. (editors), Springer, New York, NY, 2005, pp. 141-156.
 9. S. Harrison, N. Hanebutte, P. Oman, & J. Alves-Foss, "The MILS Architecture for a Secure Global Information Grid," *Crosstalk – The Journal of Defense Software Engineering*, Vol. 18(10), Oct. 2005, pp. 20-24.
 10. F. Sheldon, T. Potok, A. Krings, & P. Oman, "Critical Energy Infrastructure Survivability, Inherent Limitations, Obstacles and Mitigation Strategies," *International Journal of Power and Energy Systems – Special Issue on Blackouts*, Summer, 2004, pp. 86-92.
 11. G. Stark, P. Oman, A. Skillicorn, and R. Ameele, "An Examination of the Effects of Requirements Changes on Software Maintenance Releases," *Journal of Software Maintenance*, Vol. 11, 1999, pp. 293-309.
 12. G. Stark & P. Oman, "Software Maintenance Strategies: Observations from the Field," *Journal of Software Maintenance*, Vol. 9, 1997, pp. 365-378.
 13. K. Welker, P. Oman, & G. Atkinson, "Development and Application of an Automated Source Code Maintainability Index," *Journal of Software Maintenance*, Vol. 9(3), May/June, 1997, pp. 127-159.
 14. G. Stark & P. Oman, "A Survey Instrument for Understanding the Complexity of Software Maintenance," *Journal of Software Maintenance*, Vol. 7(6), Nov./Dec., 1995, pp. 421-441.
 15. J. Foster, P. Oman & K. Van Houten, "Algorithms for a Self Delimiting Representation of Trees," *Congressus Numerantium*, Vol. 107, Dec. 1995, pp. 5-22.

16. K. Welker & P. Oman, "Software Maintainability Metrics Models in Practice," *Crosstalk: The Journal of Defense Software Engineering*, Vol. 8(11), Nov./Dec. 1995, pp. 19-23,32.
17. D. Coleman, B. Lowther & P. Oman, "The Application of Software Maintainability Models on Industrial Software Systems," *Journal of Systems and Software*, Vol. 29(1), Apr. 1995, pp. 3-16.
18. T. Khoshgoftaar & P. Oman, "Software Metrics: Charting the Course," *IEEE Computer*, Vol. 27(9), Sept. 1994, pp. 13-15.
19. D. Coleman, D. Ash, B. Lowther & P. Oman, "Using Metrics to Evaluate Software System Maintainability," *IEEE Computer*, Vol. 27(8), Aug. 1994, pp. 44-49.
20. P. Oman & J. Hagemester, "Constructing and Testing of Polynomials Predicting Software Maintainability," *Journal of Systems and Software*, Vol. 24(3), Mar. 1994, pp. 251-266.
21. P. Oman, K. Van Houten & J. Foster, "Representing Arbitrary Trees as Self Delimiting Binary Strings," *Congressus Numerantium*, Vol. 96, 1993, pp. 47-56.
22. P. Oman, "Case Study in SQA Audits," *Software Quality Journal*, Vol. 2(1), Mar. 1993, pp. 13-27.
23. P. Oman & K. Van Houten, "On the Use of Binary Strings to Represent Tree Structures," *The Computer Journal*, Vol. 35, Nov. 1992, pp. A463-466.
24. K. Nichols & P. Oman, "Navigating Complexity to Achieve High Performance," *IEEE Software*, Vol. 8(5), Sept. 1991, pp. 12-15.
25. P. Oman & C. Cook, "A Programming Style Taxonomy," *Journal of Systems and Software*, Vol. 15, July 1991, pp. 287-301.
26. T. Lewis & P. Oman, "The Challenge of Software Development," *IEEE Software*, Vol. 7(6), Nov. 1990, pp. 9-12.
27. P. Oman & C. Cook, "Design and Code Traceability Using a PDL Metrics Tool," *Journal of Systems and Software*, Vol. 12(3), July 1990, pp. 189-198.
28. D. Smith & P. Oman, "Software Tools in Context," *IEEE Software*, Vol. 7(3), May 1990, pp. 15-19.
29. P. Oman, "Software Tools for Maintenance," *IEEE Software*, Vol. 7(3), May 1990, pp. 59-65.
30. P. Oman & C. Cook, "Typographic Style is More Than Cosmetic," *Communications of the ACM*, Vol. 33(5), May 1990, pp. 506-520.
31. P. Oman & T. Saeed, "Protect Your Intellectual Property," *IEEE Potentials*, Vol. 9(2), May 1990, pp. 22-23. Reprinted in *Professional Awareness Guide*, IEEE, Piscataway, NJ, 1994, pp. 26-27.
32. P. Oman, "Rapid Prototyping Tools Mature," *IEEE Spectrum*, Vol. 27(2), Feb. 1990, pp. 34-35.
33. T. Pearse & P. Oman, "Preparing for Professionalism," *IEEE Potentials*, Vol. 9(1), Feb. 1990, pp. 32-33.
34. P. Oman & C. Cook, "The Book Paradigm for Improved Software Maintenance," *IEEE Software*, Vol. 7(1), Jan. 1990, pp. 39-45.
35. P. Oman, C. Cook, & M. Nanja, "Effects of Programming Experience in Debugging Semantic Errors," *Journal of Systems and Software*, Vol. 9(2), Mar. 1989, pp. 197-207.
36. P. Oman & D. Willson, "Paradigm for K-8 Computer Curriculum Design," *T.H.E. Journal*, Vol. 14(2), Sept. 1986, pp.82-88.

37. P. Oman, "Identifying Student Characteristics Influencing Success in Introductory Computer Science Courses," *AEDS Journal*, Vol. 19(2,3), Winter/Spring 1986, pp. 226-233.

Other Journal/Magazine Articles.

1. P. Oman, E. Schweitzer, and J. Roberts, "Protecting the Grid from Cyber Attack, Part 2: Safeguarding IEDs, Substations, and SCADA Systems," *Utility Automation*, Vol. 7(1), Jan./Feb. 2002, pp. 25-32.
2. P. Oman, E. Schweitzer, and J. Roberts, "Protecting the Grid from Cyber Attack, Part 1: Recognizing Our Vulnerabilities," *Utility Automation*, Vol. 6(7), Nov./Dec. 2001, pp. 16-22.
3. G. Deshpande, T. Pearse & P. Oman, "An Annotated Bibliography on Software Portability," *ACM SIGPLAN Notices*, Vol. 32(2), Feb. 1997, pp. 45-53.
4. B. Lowther & P. Oman, "Toward Mature Desktop Programming Environments," *IEEE Computer*, Vol. 25(10), Oct. 1992, pp. 102-104.
5. J. Hagemester & P. Oman, "Powerful CASE on the Mac," *IEEE Computer*, Vol. 25(7), July 1992, pp. 84-87.
6. J. Hagemester, B. Lowther, P. Oman, X. Yu, & W. Zhu, "An Annotated Bibliography on Software Maintenance," *ACM Software Engineering Notes*, Vol. 17(2), Apr. 1992, pp. 79-84.
7. L. Hermens & P. Oman, "Powerful Front-End CASE and SQL, Too," *IEEE Software*, Vol. 8(1), Jan. 1991, pp. 106-112.
8. P. Oman & L. Hermens, "Two Mac Users Look at MS-DOS Graphical Interfaces: DOS 4.01, Windows 3.0, & OS/2 1.2," *IEEE Software*, Vol. 7(6), Nov. 1990, pp. 92-94, 112.
9. P. Oman, "CASE Tools for Analysis and Design," *IEEE Software*, Vol. 7(3), May 1990, pp. 37-43.
10. P. Oman, G. Perrone, & D. Moreaux, "Teamwork: Rough Around the Edges," *IEEE Software*, Vol. 7(2), Mar. 1990, pp.106-108.
11. E. Thomas & P. Oman, "A Bibliography of Programming Style Literature," *ACM SIGPLAN Notices*, Vol. 25(2), Feb. 1990, pp. 7-16.
12. J. Dickinson & P. Oman, "Tex/LaTeX: A Natural for Technical Publishing," *IEEE Software*, Vol. 6(5), Sept. 1989, pp. 97-100.
13. J. Bertani & P. Oman, "An Objective Look at C++ Environments," *IEEE Software*, Vol. 6(2), Mar. 1989, pp. 100-105.
14. P. Oman, C. Gomes, K. Rains, & M. Morandi, "Posture and VDU Operator Satisfaction," *ACM SIGCHI Bulletin*, Vol. 20(3), Jan. 1989, pp. 52-57.
15. P. Oman & C. Cook, "A Paradigm for Programming Style Research," *ACM SIGPLAN Notices*, Vol. 23(12), Dec. 1988, pp. 69-78.
16. P. Oman, "College Survey: Are VDT Operator Complaints Real?," *The Office*, vol. 108(2), Aug. 1988, pp. 61-62.
17. P. Oman, "Telesoft Ada Revisited," *IEEE Software*, Vol. 4(4), July 1987, pp. 89-90.
18. P. Oman, "Software Engineering Practicums: Case Study of a Senior Capstone Sequence," *ACM SIGCSE Bulletin*, Vol. 18(2), June 1986, pp.53-57.
19. P. Oman, "Logitech Modula-2/86: Review and Comparison," *IEEE Software*, Vol. 3(3), May 1986, pp. 76-78.

Conference Papers (International titles are *refereed*, others are *reviewed*).

1. R. Bradetich & P. Oman, "Implementing SCADA Security Policies via Security-Enhanced Linux," submitted to the *Western Power Delivery Automation Conference*, (Apr. 7-10, Spokane, WA), in review Spring 2008.
2. J. Robinson, W. S. Harrison, N. Hanebutte, P. Oman, & J. Alves-Foss, "Implementing middleware for content filtering and information flow control," *Proceedings of the 2007 Workshop on Computer Security Architecture, ACM Conference on Computer and Communications Security*, (Oct. 29 – Nov. 2, Fairfax, VA), 2007, pp. 47-53.
3. R. Bradetich, P. Oman, "Connecting SCADA Systems to Corporate IT Networks Using Security-Enhanced Linux," *34th Annual Western Protective Relay Conference*, (Oct. 16-18, Spokane, WA), 2007. Available at www.selinc.com/techpprs.
4. A. Abdel-Rahim, P. Oman, B.K. Johnson, and R.A. Sadiq, "Assessing Surface Transportation Network Component Criticality: A Multi-Layer Graph-Based Approach," *IEEE Intelligent Transportation Systems Conference* (Sept. 30 - Oct. 3, Seattle, WA), 2007, pp. 1000-1003.
5. P. Oman & M. Phillips, "Implementing and Testing a Custom IDS for Substation and Process Control Systems," Paper #7, *IFIP International Conference on Critical Infrastructure Protection*, (Mar. 19-21, Dartmouth, NH), 2007.
6. R. Bradetich & P. Oman, "Connecting SCADA and Corporate IT Networks Using SE-Linux," Paper #13, *Third Annual Security Enhanced Linux Symposium* (March 12-16, Baltimore, MD), 2007.
7. D. Conte de Leon, J. Alves-Foss, & P. Oman, "Implementation-Oriented Secure Architectures," Paper ST14-01, *Proceedings of the 40th Annual Hawaii International Conference on System Sciences*, (January 3-6, Waikoloa, HI), 2007.
8. A. Abdel-Rahim, P. Oman, B. Johnson, and L. Tung, "Survivability Analysis of Large Scale Intelligent Transportation System Networks," presented at the *Transportation Research Board Annual Meeting*, (Jan. 21-25, Wa. D.C.), TRB of the National Academies, 2007.
9. K. King, D. Manz, P. Ortman, D. Shikashio, & P. Oman, "A Rapidly Reconfigurable Computer Lab for Software Engineering Security Experiments and Exercises," *Workshop on Secure Software Engineering Education & Training*, in conjunction with the *19th Conference on Software Engineering Education and Training*, (April 19-21, Turtle Bay, Oahu, HI), 2006.
10. B. Rossebo, P. Oman, J. Alves-Foss, R. Blue, & P. Jaskowiak, "Using Spark Ada to Model and Verify a MILS Message Router," *IEEE International Symposium on Secure Software Engineering*, (March 13-15, Arlington, VA), 2006, pp. 7-14.
11. M. Benke, A. Abdel-Rahim, P. Oman, and B. Johnson, "Assessing Transportation Network Security and Survivability: A Case Study of a Small Urban Traffic Signal System," *Proceedings of the Transportation Research Board 85th Annual Meeting*, Paper # 06-2998, (January 22-26, Washington, DC), 2006.
12. S. Caltagirone, P. Ortman, S. Melton, D. Manz, K. King, and P. Oman, "Design and Implementation of a Multi-use Attack-Defend Computer Security Lab," Paper STISE09, *Proceedings of the 39th Annual Hawaii International Conference on System Sciences*, (January 4-7, Poipu, HI), 2006.
13. J. Conrad, P. Oman, and C. Taylor, "Managing Uncertainty in Security Risk Model Forecasts with RAPSAC/MC," presented at the *IFIP TC 11 WG 11.1 and IFIP 11.5 Joint*

- Working Conference on Security Management, Integrity, and Internal Control in Information Systems*, (Dec. 1-2, Fairfax, VA), 2005.
14. N. Hanebutte & P. Oman, "An Evaluation of Static Source Code Analyzers for Automated Vulnerability," *9th International Conference on Software Engineering and Applications*, (Nov. 14-16, Phoenix, AZ), IASTED ACTA Press, 2005, pp. 112-117.
 15. S. Caltagirone, P. Ortman, S. Melton, D. Manz, K. King, and P. Oman, "RADICL: A Reconfigurable Attack-Defend Instructional Computing Laboratory," *Proceedings of the International Conference on Security and Management*, (June 20-23, 2005, Las Vegas, NV), CSREA Press, 2005, pp. 97-103.
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2. "Defense Against the Dark Arts: Safeguarding Your Computer From Hackers, Crackers, and Identity Thieves," tutorial presented at the 39th *Hawaii International Conference on System Science*, (Jan. 3-6, Poipu, HI), 2006.
3. "Critical Infrastructure Survivability Analysis," invited presentation, Ada County Emergency Management Committee, (Dec. 8, Boise, ID), 2005.
4. "Fundamentals – and Beyond – of Computer and Network Security," tutorial presented at the 38th *Hawaii International Conference on System Science*, (Jan. 3-6, Waikoloa, HI), 2005.
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45. "Assessing Software Maintainability: A Progress Report," invited presentation, *Software Maintenance Practitioners' Forum*, Hewlett-Packard, San Jose, CA, Jan. 1992.
46. "A Course on Producing High Quality, Reliable Software," invited presentation (with W. Harrison), *U.N. mission to Bangalore, India*, organized by the U.S. State Dept., sponsored by the International Telecommunication Union, July-Aug. 1991.

47. "C Language Seminar," invited presentation, *Puget Sound Power and Light*, Bellevue, WA, June-July, 1991.
48. "Experiments in Program Comprehension and Maintenance," invited talk, *Hewlett-Packard Corporate Engineering*, Software Maintenance Program, Palo Alto, CA, June 1991.
49. "CSM-90 Software Tools Fair," an invited appointment as Tools Fair Chair, *IEEE Conference on Software Maintenance 1990*, San Diego, CA, Nov. 1990.
50. "Lessons Learned from CSM-90," invited panel discussion, *IEEE Conference on Software Maintenance 1990*, San Diego, CA, Nov. 1990.
51. "Object-Oriented Maintenance Tools," session chair, *IEEE Conference on Software Maintenance 1990*, San Diego, CA, Nov. 1990.
52. "CASE Throughout the Life Cycle," invited talk, *Advanced Hardware Architectures Seminar*, Moscow, ID, Oct. 1990.
53. "Design and Code Traceability in PDL: Quality Control Aspects," invited presentation, *Quality Week 1990 -- Software Quality Conference*, San Francisco, CA, May 1990.
54. "Design and Code Traceability in PDL," invited talk, *Varian Technical Seminar*, Palo Alto, CA, May 1990.
55. "Design and Code Traceability Using a PDL Metrics Tool," refereed paper, *Second Annual Oregon Workshop on Software Metrics*, Portland, OR, Mar. 1990.
56. "Challenges and Opportunities for Industry and Academia in Software Metrics," invited participation in a panel discussion, *Second Annual Oregon Workshop on Software Metrics*, Portland, OR, Mar. 1990.
57. "A Taxonomy for Programming Style," refereed paper, *18th Annual ACM Computer Science Conference*, Washington D.C., Feb. 1990.
58. "Programming Style and Program Comprehension," invited talk, *Hewlett-Packard CWO*, Corvallis, OR, Jan. 1990.
59. "Programming Style Authorship Analysis," refereed paper, *17th Annual ACM Computer Science Conference*, Louisville, KY, Feb. 1989.
60. "Posture Adaptations at Computer Workstations," refereed presentation, *2nd International Conference on Human-Computer Interaction*, Honolulu, HI, Aug. 1987.
61. "Displays of Posture Adaptation at Computer Workstations," a computer program demonstration, *Human Factors in Computing Systems and Graphics Interface Joint Conference*, Toronto, Canada, Apr. 1987.
62. "Why Pascal?, What is Systems Analysis?, and K-12 Computer Curriculum," invited talks, *1987 West Kootenay Zonal Conference*, Nelson, B.C., Canada, Mar. 1987.
63. "Benchmarking Programming Systems," *Northwest Council for Computer Education Annual Conference*, Portland, OR, Feb. 1987.
64. "Structure and Function of Programming Languages," invited talk, *Northwest Council for Computer Education Annual Conference*, Seattle, WA, Feb. 1986.
65. "Paradigms for Computer Curriculum Design," *Northwest Council for Computer Education Annual Conference*, Seattle, WA, Feb. 1986.
66. "Identifying Student Characteristics Influencing Success in Introductory Computer Science Courses," *Association for Educational Data Systems Annual Conference*, Toronto, Canada, Apr. 1985.
67. "Structure and Function of Programming Languages," *Northwest Council for Computer Education Annual Conference*, Eugene, OR, Feb. 1985.

68. "The Evolution of Computing Machinery," *Northwest Council for Computer Education Annual Conference*, Olympia, WA, Feb. 1984.
69. "Dealing with Data Processing Personnel, Demystifying the Computer: What it is and How it Works, Do's and Don't's: Safeguard Your Computer Data, Survey of Popular Computers, and Tying Equipment Together: Local Area Networks," invited talks, *Computers in the Law Office Conference*, sponsored by the Oregon Law Institute, Lewis and Clark Law School, Portland, OR, 1983.
70. "Computers in the Curriculum: Literacy without Programming, and Setting up a Microcomputer Laboratory," *Northwest Council for Computer Education Annual Conference*, Corvallis, OR, Feb. 1983.
71. "Computer Applications in Continuing Education Administration," invited talk, *National University Continuing Education Administration Annual Conference*, Boise, ID, 1982.

ACADEMIC EDUCATION:

Ph.D., Computer Science, 1989, Oregon State University, (GPA 3.96/4.0),
 Dissertation: A Taxonomic Analysis of Typographic Programming Style
 M.S., Computer Science, 1979, Oregon State University, (GPA 3.95/4.0),
 Thesis: Personalized Information Management Systems with Tutorial Capabilities
 B.S., Psychology (with high scholarship), 1976, Oregon State University,
 Subjects: Experimental Psychology and Statistics

PROFESSIONAL and SCHOLARLY MEMBERSHIPS:

Association for Computing Machinery (1982-present)
 IEEE Computer Society (1984-present)
 Institute of Electrical and Electronics Engineers (1984-present; Senior Member, 2001)
IEEE Computer (Editorial Board member, 1993-1995)
IEEE Software (Software Test Lab editor, 1987-1991; Associate Editor-in-Chief, 1990-1991)
 Northwest Council for Computer Education (member 1981-1993; Treasurer 1982-1989)
 Phi Kappa Phi Honor Society (lifetime member; nominations committee 1980-1981)
Software Quality Journal (Editorial Board member, 1991-2000)

CONTRACTED CONSULTING and TRAINING SERVICES to:

Conjungi Networks, Inc.
 Consortium for International Fisheries and Aquaculture
 Department of Environmental Quality
 Environmental Protection Agency
 Hewlett-Packard Corporate Engineering
 Idaho National Engineering Lab, EG&G Idaho
 Idaho National Environmental Engineering Lab, Lockheed Martin & Bechtel BWXT Idaho
 John Wiley & Sons Publishers
 La Grande, North Powder, and Ontario (Oregon) School Districts
 National University Continuing Education Association
 Objective Interface Systems, Inc.
 Oregon Law Institute
 Puget Sound Power and Light
 Schweitzer Engineering Laboratories

Scientech, Inc.
 Society of American Foresters
 Umatilla and Union County (Oregon) Educational Service Districts
 University of California Berkeley Extension Service
 U.S. Department of Energy
 U.S. Department of Labor, Institute for Manpower Studies

COMPUTER EXPERIENCE:

Hardware: HP 700 series, CDC CYBER 170/720, CDC 3300, IBM 4341 and 4381, VAX 11/780, Honeywell 440/66, PDP 11 Series, PDP 8, HP 9000, DecStation 5000, Apollo DN 10000 and 3500 series, Datapoint 6600, Datapoint 3800, Pentium PCs, IBM PC/XT/AT and PS/2 series, Apple Mac series, Intel and various other microcomputers

Software: CMS, Unix, HP-UX, Ultrix, VAX VMS, NOS, KRONOS, OS-3, GCOS, ARC, TSX+, RSX, RT-11, Lex, YACC, IMSL, SPSS, SAS, SIPS, Minitab, BMDP, SIR, Famulus, Modify, LIBGEN, LIBEDIT, CP/M, MSDOS, TeX, LaTeX, Macintosh System 7.0, Apple OS X, Windows 95/98/NT/2000/XP, Sun Solaris, Linux

Languages: Ada, Algol, BASIC, C, C++, COBOL, COMPASS, DATABUS, FORTRAN, HTML, Java, LOGO, Meta, Modula-2, Pascal, various assembly languages

TEACHING EXPERIENCE:

Graduate & Upper Division: Systems Programming, Compiler Design, Software Engineering, Metrics and Modeling, Software Design, Foundations of Programming, Theory of Computation, Operating Systems, Experimental Psychology, Computer Security, Power Grid Security, Real-time Control Systems, Research Seminars

Lower Division: Data Structures & Algorithms, Assembly Language Programming, Business Data Processing, Discrete Structures, Structured Programming, Symbolic Programming, Computer Organization, Statistics, General Psychology, Human Sexuality, Human Adjustment

Seminars & Workshops: Object Oriented Design, Software Engineering Methods, CASE & Testing Tools, Software Reliability Measurement, Software Quality Assurance, Computers for Teachers, Computers for Administrators, Technology in American Society, Computers for Communications and Information Sharing, Database Management Systems, Structure and Function of Programming Languages, Programming Environments, Microcomputer Applications, Structured Design & Programming Methods, Statistical Data Analysis, Psychological Testing and Measurement, Human Factors Analysis and Ergonomics, Intellectual Property Protection, Fundamentals of Computer and Network Security

GRADUATE STUDENT SUPERVISION (as Major Professor):

Using SE-Linux Object Type Enforcement Domains to Logically Isolate SCADA Networks, Ryan Bradetich, August 2007.

Experiments in Wireless SCADA System Vulnerabilities, Sean Melton, MS Research Project Report, August 2006.

Critical Point Identification of Traffic Networks Using Simulations and Graph Based Analysis, Sandeep Butapati, MS Thesis, May 2006.

- Graph Algorithms and Data Structures for Traffic Network Critical Component Analyses*, Rakesh Kalidindi, MS Research Project Report, April 2006.
- Event Monitoring and Intrusion Detection in SCADA Systems*, Matt Phillips, MS Thesis, September, 2005.
- Multilayered Analysis of Transportation Systems*, Matt Benke, MS Thesis, August 2005.
- Designing and Building a Rapidly Reconfigurable Attack-Defend Instructional Computing Laboratory*, Paul Ortman, MS Thesis, June 2005.
- A Testbed for SCADA Security and Survivability Research and Instruction*, John Waite, MS Thesis, January 2005.
- Implementation of an Inter-Partition Communication System in the MILS Architecture*, Mike Loosbrock, MS Research Project Report, December, 2004.
- An Analysis of Security and Survivability as Software Quality Attributes*, Nadine Hanebutte, Ph.D. Dissertation, May 2004.
- The Conceptual Source Code Module: An Approach to Processing C and C++ Source Code Files*, Miles Penner, MS thesis, August 1999.
- Tactical Software Project Management Using Metrics Signatures*, Ambika Baburaj, MS thesis, August 1999.
- Using Relative Complexity to Allocate Resources in Gray Box Testing of Object-Oriented Code*, Jianqiang Zhuo, Ph.D. dissertation, May 1997.
- Statistical Modeling of Software Quality Measures to Uncover Missing Metrics and Measurement Domains*, Govind Deshpande, Masters thesis, May 1997.
- An Analysis of Process and Product Metrics for Enhancing Project Visibility*, Gerald Atkinson, MS Research Project Report, May 1997.
- Implementing and Validating a Metrics Set for Static Code Reusability Assessment*, Regi John, Masters thesis, June 1996.
- A Study of Software Portability to Identify Tangible Characteristics of Portable Programs*, Troy Pearse, Masters thesis, June 1996.
- A Study on Monotonicity and the Use of Halstead's Metrics*, Bradley Zheng, Masters thesis, Dec. 1995.
- Developing Solutions for Time-Constrained Robot Path-Planning*, Dale Swanson, Masters thesis, May 1995.
- Static Techniques for Measuring Software Reusability*, Zhijian Chen, Masters thesis, Dec. 1994.
- Constructing and Testing C-MAT: A C Source Code Maintainability Assessment Tool*, Jianqiang Zhuo, Masters thesis, June 1994.
- The Application of Software Maintainability Metric Models to Industrial Software Systems*, Bruce Lowther, Masters thesis, August 1993.
- Spiral Prototyping: Definition, Application, and Comparison to Specifying*, Xin Yang, Masters thesis, May 1993.
- A Metric Approach to Assessing the Maintainability of Software*, Jack Hagemester, Masters thesis, December 1992.
- A Comparison of Software Maintainability Indices*, Fang Zhuo, Masters thesis, September 1992.
- Algorithms for Binary String Tree Manipulation*, Weiguo Zhu, Masters thesis, June 1992.
- The Legal Protection of Software: An Examination of Alternatives to the Existing Protection Schemes*, Linda Corder, Masters thesis, June 1992.
- A Software Specification Tool for Increased Requirements Traceability*, Leonard Hermens, Masters thesis, August 1991.

- A Software Tool for Manpower Management*, Carl Tyrrell, Masters research project, May 1991.
- A Formalism for the Detection and Prevention of Illicit Program Derivations*, Don Moreaux, Masters thesis, May 1991.
- Prototyping vs. Specifying: An Experimental Comparison of Complexity, Effort, and Quality*, Grant Spencer, Masters thesis, January 1991.