Matthew Allen Bishop

Address

Department of Computer Science
University of California, Davis
One Shields Ave.
Davis, CA 95616-8562

Work History

- July 2004–*current*: Professor
  Department of Computer Science, University of California at Davis
- July 1997–June 2004: Associate Professor
  Department of Computer Science, University of California at Davis
- July 1993–June 1997: Assistant Professor
  Department of Computer Science, University of California at Davis
- July 1987 – July 1993: Assistant Professor
  Department of Mathematics and Computer Science, Dartmouth College
- October 1984 – July 1987: Research Scientist
  Research Institute for Advanced Computer Science, NASA Ames Research Center
- May 1982 – August 1982 *and* May 1983 – September 1984: Systems Programmer
  Megatest Corporation

Education

- Ph.D. in Computer Science: Purdue University, West Lafayette, IN, May 1984
  Thesis title: *Practical Take-Grant Systems: Do They Exist?*
  Thesis advisor: Prof. Dorothy Denning
- MS in Computer Science: Purdue University, West Lafayette, IN, May 1981
- MA in Mathematics: University of California, Berkeley, CA, June 1978
- AB in Astronomy and Applied Mathematics: University of California, Berkeley, CA, June 1978

Publications

Books

1. M. Bishop, *Introduction to Computer Security*, Addison-Wesley Professional, Boston, MA (2005); ISBN 0-321-24744-2 (747+xxxii pages).

2. M. Bishop, *Computer Security: Art and Science*, Addison-Wesley Professional, Boston, MA (2003); ISBN 0-201-44099-7 (1084+xli pages).

Book Chapters

3. M. Bishop, "Psychological Acceptability Revisited," Chapter 3 in *Designing Secure Systems That People Can Use*, by Lorrie Cranor and Simson L. Garfinkel, O'Reilly and Associates, Petaluma, CA (2005); *in press*.

"Cyber Defense Technology Networking and Evaluation," *Communications of the ACM* **47**(3) pp. 58–61 (Mar. 2004).

20. M. Bishop, "What is Spam?", statement for panel, *Annual Computer Security Applications Conference* (Dec. 2003).

21. D. Gilliam, J. Powell, E. Haugh, and M. Bishop, "Addressing Software Security Risk Mitigation in the Life Cycle," *Proceedings of the 28th Annual NASA/IEEE Goddard Software Engineering Workshop* pp. 201–206 (Dec. 2003).

22. M. Bishop and E. Goldman, "The Strategy and Tactics of Information Warfare," *Contemporary Security Policy*, pp. 113–139 (June 2003).

23. D. Gilliam, T. Wolfe, J. Sherif, and M. Bishop, "Software Security Checklist for the Software Life Cycle," *Proceedings of the 12th IEEE International Workshop on Enabling Technologies: Infrastructure for Collaborative Enterprises (WETICE 2003)* pp. 243–248 (June 2003).

24. M. Bishop, "Teaching Undergraduate Information Assurance," *Security Education and Critical Infrastructure: Proceedings of the Third World Conference on Information Security Education* pp. 169–171 (June 2003).

25. E. Haugh and M. Bishop, "Testing C Programs for Buffer Overflow Vulnerabilities," *Proceedings of the 2003 Symposium on Networked and Distributed System Security (NDSS 2003)* pp. 123–130 (Feb. 2003).

26. D. Peterson, M. Bishop, and R. Pandey, "A Flexible Containment Mechanism for Executing Untrusted Code," *Proceedings of the 11th USENIX UNIX Security Symposium* pp. 207–225 (Aug. 2002).

27. M. Bishop, "Computer Security Education: Training, Scholarship, and Research," *Computer* **35**(4) *Privacy and Security Supplement* pp. 30–32 (Apr. 2002).

28. M. Bishop, "How Useful is Software Fault Injection for Evaluating the Security of COTS Products" position paper, *Seventeenth Annual Computer Security Applications Conference* p. 340 (Dec. 2001).

29. D. Gilliam, J. Powell, J. Kelly, and M. Bishop, "Reducing Software Security Risk Through an Integrated Approach," *Proceedings of the 26th Annual NASA/IEEE Goddard Software Engineering Workshop* pp. 36–42 (Nov. 2001).

30. D. Gilliam, J. Kelly, J. Powell, and M. Bishop, "Development of a Software Security Assessment Instrument to Reduce Software Security Risk," *Proceedings of the 10th IEEE International Workshop on Enabling Technologies: Infrastructure for Collaborative Enterprises (WETICE 2001)* pp.144–149 (June 2001).

31. M. Bishop, "Education in Information Security," *IEEE Concurrency* **8**(4) pp. 4–8 (Oct. 2000).

32. D. Gilliam, J. Kelly, and M. Bishop, "Reducing Software Security Risk Through an Integrated Approach," *Proceedings of the IEEE 9th International Workshops on Enabling Technologies: Infrastructure for Collaborative Enterprises (WETICE 2000)* pp.141–146 (June 2000).

33. T, Aura, M. Bishop, and D. Sniegowski, "Analyzing Single-Server Network Inhibition," *Proceedings of the 13th IEEE Computer Security Foundations Workshop (CSFW-13)* pp.108–117 (July 2000).

34. B. Hashii, S. Malabarba, R. Pandey, and M. Bishop, "Supporting Reconfigurable Security Policies for Mobile Programs," *Computer Networks* **33**(1-6) pp. 77–93 (June 2000).

54. M. Bishop, "Proactive Password Checking," *Proceedings of the Fourth Workshop on Computer Security Incident Handling* pp. W11:1-9 (Aug. 1992).

55. M. Bishop, "A Cautionary Tale," *Proceedings of the Workshop on Future Directions in Computer Misuse and Anomaly Detection*, pp. 110-114 (Mar. 1992).

56. M. Bishop, "Privacy-Enhanced Electronic Mail," *Journal of Internetworking: Research and Experience* **2**(4) pp. 199-233 (Dec. 1991).

57. M. Bishop, "Comparing Authentication Systems," *Proceedings of the Third Workshop on Computer Incident Handling* pp. G-II-1:10 (Aug. 1991).

58. M. Bishop, "A Proactive Password Checker," *Proceedings of the Seventh International Conference on Information Security* pp. 169-181 (May 1991).

59. M. Bishop, "An Overview of Computer Viruses in a Research Environment," *Proceedings of the Fourth Annual Computer Virus and Security Conference*, pp. 111-144 (Mar. 1991).

60. M. Bishop, "Password Management," *COMPCON 1991 Proceedings*, pp. 167-169 (Feb. 1991).

61. M. Bishop, "Authenticated Network News," *Proceedings of the 1991 Winter USENIX Conference*, pp. 281-287 (Jan. 1991).

62. M. Bishop, "A Security Analysis of the NTP Protocol," *Sixth Annual Computer Security Conference Proceedings*, pp. 20-29 (Dec. 1990).

63. M. Bishop, "An Extensible Password Changing Program", *Proceedings of the UNIX Security Workshop II*, pp. 15-16 (Aug. 1990).

64. M. Bishop, "Collaboration Using Roles," *Software – Practice and Experience* **20**(5) pp. 485-498 (May 1990).

65. M. Bishop, "A Model of Security Monitoring", *Fifth Annual Computer Security Conference Proceedings*, pp. 46-52 (Dec. 1989).

66. M. Bishop, "UNIX™ Security in a Supercomputing Environment", *Supercomputing '89 Proceedings*, pp. 693-698 (Nov. 1989).

67. M. Bishop, "Privacy-Enhanced Electronic Mail", *Proceedings of the DIMACS Workshop on Distributed Computing and Cryptography*, pp. 93-106 (Oct. 1989).

68. M. Bishop, "Auditing Files on a Network of UNIX™ Machines", *Proceedings of the UNIX Security Workshop*, pp. 51-52 (Aug. 1988).

69. M. Bishop, "Theft of Information in the Take-Grant Protection Model", *Proceedings of the Workshop on Foundations of Computer Security*, MITRE TR M88-37, pp. 194-218 (June 1988).

70. M. Bishop, "An Application of a Fast Data Encryption Standard Implementation", *Computing Systems* **1**(3) pp. 221-254 (Summer 1988).

71. M. Bishop, "Profiling under UNIX™ by Patching," *Software – Practice and Experience* **17**(10) pp. 729-740 (Oct. 1987).

72. M. Bishop, "Sharing Accounts", *Proceedings of the Large Installation System Administrator's Workshop*, p. 135 (Apr. 1987).

73. M. Bishop and B. Leiner, "Access Control and Privacy in Large Distributed Systems," *AIAA/ASIS/DODCI Second Aerospace Computer Security Conference: A Collection of Technical Papers*, pp. 95-98 (Dec. 1986).

92. M. Bishop, "Privacy Enhanced Electronic Mail," *;login:* **17**(6) pp. 20-22 (Nov./Dec. 1992).

93. M. Bishop, "Managing Superuser Privileges Under UNIX," *README* **5**(2) pp. 1-13 (Spring 1990).

94. M. Bishop, "Storage in C," *C Users' Journal* **8**(5) pp. 73-78 (May 1990).

95. M. Bishop, "Computer Viruses and UNIX™," *Berson & Lunt Data Security Letter* no. 11, pp. 6-9 (July 1989).

96. M. Bishop, "File Protection in UNIX™," *The DEC Professional* Special Edition, pp. 44-48 (June 1987).

97. M. Bishop, "The RIACS Mail System," *;login:* **12**(3) pp. 3-26 (May/June 1987).

98. M. Bishop, "Array Names and Pointers," *The C Journal* **3**(1) pp. 44-46 (Spring 1987).

99. M. Bishop, "How To Write A Setuid Program," *;login:* **12**(1) pp. 5-11 (Jan./Feb. 1987).

100. M. Bishop, "Scope in C," *The C Journal* **2**(1) pp. 40-47 (Spring 1986).

101. M. Bishop, "Portability in C – A Case Study," *The C Journal* **1**(4) pp. 25-31 (Winter 1986).

102. M. Bishop, "Trnum - A Program to Number Figures," *Text in Computers* **1**(1) pp. 9-15 (July 1986).

103. M. Bishop, "Some Issues in Medium-Term Incident Handling," position paper prepared for the *CERT Invitational Workshop on Research in Incident Handling* (Nov. 1992).

104. M. Bishop, "Executive Summary" and "Overview of the Workshop and Technical Summary," *Proceedings of the Workshop on Future Directions in Computer Misuse and Anomaly Detection*, pp. 1-4 and 5-15 (Mar. 1992)

105. M. Bishop, "The Role of Technology in the Cracker Problem," *Proceedings of the 14th National Computer Security Conference*, p. 665 (Oct. 1991).

106. M. Bishop, "Password Checking Techniques," *Proceedings of the Second Invitational Workshop on Computer Security Incident Response*, III-D-1 (June 1990).

Technical and Research Memoranda

107. M. Bishop, "A Taxonomy of UNIX System and Network Vulnerabilities", ECS-95-10, Department of Computer Science, University of California at Davis (Sep. 1995).

108. M. Bishop, "Race Conditions, Files, and Security Flaws; or, the Tortoise and the Hare *Redux*", ECS-95-9, Department of Computer Science, University of California at Davis (Aug. 1995).

109. M. Bishop, "Detecting Race Conditions in UNIX File System Accesses" (with M. Dilger), ECS-95-8, Department of Computer Science, University of California at Davis (Aug. 1995).

110. M. Valence, L. Wisniewski, and M. Bishop, "Process Migration for Heterogeneous Distributed Systems," PCS-TR95-264, Department of Computer Science, Dartmouth College (Aug. 1995).

111. M. Bishop, "Implementation Notes on *bdes*(1)," PCS-TR91-158, Department of Mathematics and Computer Science, Dartmouth College (Apr. 1991).

112. M. Bishop, "An Overview of Computer Viruses in a Research Environment," PCS-TR91-156, Department of Mathematics and Computer Science, Dartmouth College (Mar. 1991).

131. M. Bishop, "Spoolers and Links", RM 86.5, Research Institute for Advanced Computer Science (Jan. 1986).

132. M. Bishop, "Shell Games", RM 86.4, Research Institute for Advanced Computer Science (Jan. 1986).

133. M. Bishop, "Sendmail Wizardry", RM 86.3, Research Institute for Advanced Computer Science (Jan. 1986).

134. M. Bishop, "The ADB Compromise", RM 86.2, Research Institute for Advanced Computer Science (Jan. 1986).

135. M. Bishop, "Analyzing the Security of the NPSN", RM 86.1, Research Institute for Advanced Computer Science (Jan. 1986).

136. M. Bishop, "News Documentation", RM 85.2, Research Institute for Advanced Computer Science (Nov. 1985).

137. "M. Bishop, Trnum - A Program to Number Figures", TR 85.7, Research Institute for Advanced Computer Science (July 1985).

138. M. Bishop, "How To Write A Setuid Program", TR 85.6, Research Institute for Advanced Computer Science (May 1985).

139. M. Bishop, *Solutions to the Exercises in "Cryptography and Data Security"*, unpublished (1983).

140. M. Bishop, "Reference Guide to the *-mab* Macros", Purdue University (Mar. 1983).

141. M. Bishop, "Security Problems with the UNIX Operating System", Purdue University (Jan. 1983).

142. M. Bishop, "XE Reference Manual", Purdue University (July 1981).

143. M. Bishop, "An XE Tutorial", Purdue University (July 1981).

144. M. Bishop and L. Snyder, "The Transfer of Information and Authority in a Protection System," TR 166, Department of Computer Science, Yale University (June 1979).

Reviews

1. J. J. Dongarra, S. W. Otto, M. Snir, and D. Walker, "A Message Passing Standard for MPP and Workstations," *Communications of the ACM* **39**(7) pp. 84-90 (July 1996)
in *Computing Reviews* **38**(6) p. 310 (June 1997)

2. D. E. Denning and D. K. Branstad, "A Taxonomy for Key Escrow Encryption Systems," *Communications of the ACM* **39**(3), pp. 34-40 (Mar. 1996)
in *Computing Reviews* **37**(12) p. 646 (Dec. 1996)

3. B. Barkee, D. C. Can, J. Ecks, T. Moriarity, and R. F. Ree, "Why You Cannot Even Hope to Use Gröbner Bases in Public Key Cryptography: An Open Letter to a Scientist Who Failed and a Challenge to Those Who Have Not Yet Failed," *Journal of Symbolic Computation* **18**(6) pp. 497-501 (Dec. 1994)
in *Computing Reviews* **37**(9) p. 476 (Sep. 1996)

4. C. H. Lin, C. C. Chang, and R. C. Lee, "A New Public-Key Cipher System Based Upon the Diophantine Equations," *IEEE Transactions on Computers* **44**(1), pp. 13-19 (Jan. 1995)
in *Computing Reviews* **37**(3) p. 165 (Mar. 1996)

Transactions on Software Engineering **SE-13**(2), pp. 208-221 (Feb. 1987)
in *Computing Reviews* **28**(11) p. 591 (Nov. 1987)

20. L. F. Marshall and J. A. Anyanwu, "A Crash Resistent UNIX™ File System," *Software–Practise and Experience* **16**(2) pp. 107-118 (Feb. 1986)
in *Computing Reviews* **27**(9) pp. 456-457 (Sep. 1986)

21. M. J. Rochkind, *Advanced UNIX™ Programming*, Prentice-Hall Inc. (1985)
in *Computing Reviews* **27**(5) pp. 233-234 (May 1986)

22. T. Plum and J. Brodie, *Efficient C*, Plum Hall Inc. (1985)
in *Computing Reviews* **27**(3) p. 121 (Mar. 1986)

Software:

1. *passwd+*, a set of programs to force users to select good password (see [49,53,54,58,63])

2. *lsu*, a set of programs to implement roles in a standard UNIX environment (see [64])

3. *binaudit*, a package to analyze files statically for alterations (see [68])

4. *deszip*, a set of programs and library routines to guess passwords rapidly (see [70])

Grants, Contracts, Awards and Gifts

Current:

1. Sep. 2003-*current: Data Management of Protected Information for Data Sharing and Collaboration*, National Science Foundation, $414,919 [co-PI with Prof. Fillia Makedon of the Dept. of Computer Science, Dartmouth College (PI) and Prof. Andrew Saykin, Dept. of Psychiatry, Dartmouth Medical School, Dartmouth College (co-PI)]

2. Aug. 2003-*current: Vulnerabilities Analysis*, National Science Foundation, $240,000 [PI]

3. Aug. 2003-*current: Balancing Privacy and Analysis in Data Sanitization*, National Science Foundation, $220,000 [PI]

4. May 2001-*current: Intrusion Detection Analysis Project*, Promia, Inc.; $289,000 [PI]

5. May 2000-*current: An Environment for Verifying Security Properties of Programs*, Jet Propulsion Laboratory; $354,000 [PI]

Completed:

6. Feb. 2003-June 2004: *Security and Intra-Agency Recordation at the County Level*, Yolo County, $19,742 [PI]

7. Sep. 2002-Mar. 2004: *Denial of Service at the Data Link Layer*, UC Micro with Captus Networks; $31,308 [PI]

8. Oct. 1999-Sep. 2000: *Denial of Service in Windows Environments*, Microsoft Corp.; $39,000 [PI]

9. Oct. 1998-Sep. 1999: *Denial of Service in the Infrastructure*, NASA Ames Research Center; $97,250 [PI]

10. Sep. 1997-Sep. 2000: *Computer Vulnerabilities and Policy-Based Security*, Intel Corp.; $225,000 [co-PI with K. Levitt and C. Wee]

11. Jan. 1997 - June 1997: *Program and System Vulnerabilities*, Trident Data Systems, Inc.; $50,000.00 [PI]

Teaching

Ph.D. Thesis Supervision

- Thomas Walcott, University of California, Davis, December 2004; thesis title "Malfeasance: A Foundation for Traducement, Libel, Heresy, and Other Traditional Security Policies"
- Andrew Gross, University of California, San Diego, June 1997; thesis title "Analyzing Computer Intrusions" (co-chair with Prof. Réné Cruz, Dept. of Computer Science, UCSD)
- George Fink, University of California, Davis, June 1996; thesis title "Discovering Security and Safety Flaws using Property-Based Testing"

M.S. Thesis Supervision

- Deanna Rogers, University of California, Davis, June 2004; thesis title "Using Deception to Enhance Anomaly Detection"
- Vincent Law, University of California, Davis, December 2003; thesis title "Vulnerability Database Integration with Intrusion Detection Systems"
- Guillermo Marro, University of California, Davis, September 2003; thesis title "Attacks at the Data Link Layer"
- David Peterson, University of California, Davis, December 2002; thesis title "A Flexible Containment Mechanism for Executing Untrusted Code"
- Eric Haugh, University of California, Davis, September 2002; thesis title "Testing C Programs for Buffer Overflow Vulnerabilities"
- Patrick LeBlanc, University of California, Davis, September 2002; thesis title "A Property-Based Static Code Analysis"
- John Hughes, University of California, Davis, June 2000; thesis title "Using Conservation of Flow as a Security Mechanism in Network Protocols"
- Peter Mell, University of California, Davis, June 1998; thesis title "Automatic Policy Satisfaction and Verification for Intranet Wide Defense Systems using Signature-Based Intrusion Detection and Response Systems"
- Joel Dodson, University of California, Davis, June 1996; thesis title "Specification and Classification of Generic Security Flaws for the Tester's Assistant Library"
- George Lin, University of California, Davis, June 1994; thesis title "Counting Cleartext Passwords in the Internet"

Courses at the University of California, Davis

1. ECS 289M, *Policy and Vulnerabilities Analysis*, graduate class
2. ECS 253, *Cryptography and Data Security*, graduate class
3. ECS 251/EEC 282, *Formal Models of Operating Systems*, graduate class
4. ECS 235, *Computer and Information Security*, graduate class
5. ECS 153, *Introduction to Computer Security*, undergraduate class
6. ECS 150, *Operating Systems*, undergraduate class
7. ECS 50, *Introduction to Machine-Dependent Programming*, undergraduate class
8. ECS 40, *Introduction to Software Development*, undergraduate class
9. ECS 30, *Introduction to Programming and Problem Solving*, undergraduate class

Courses at Dartmouth College

1. COSC 108, *Programming Languages and Systems II*, graduate class

23. Network Security, Nov. 1998: UNIX Security: Threats and Solutions; Tools for UNIX Security; UNIX Security: Threats and Solutions from the Network; UNIX Security: Security in Programming
24. SANS Australia, June 1998: UNIX Security: Threats and Solutions; Tools for UNIX Security; UNIX Security: Threats and Solutions from the Network; UNIX Security: Security in Programming
25. SANS, May 1998: UNIX Security: Threats and Solutions; Tools for UNIX Security; UNIX Security: Threats and Solutions from the Network; UNIX Security: Security in Programming
26. Network Security, Nov. 1997: UNIX Security: Threats and Solutions; Wargames: Network Security; UNIX Security Tools
27. SANS, May 1997: UNIX Security: Threats and Solutions; Wargames: Network Security; UNIX Security Tools
28. Sequent Users' Group, Feb. 1997: UNIX Security: Threats and Solutions; UNIX Security: Threats and Solutions from the Network
29. USENIX, Jan. 1997: UNIX Security Tools
30. Sun Users' Group, Dec. 1996: Advanced Topics in UNIX Security
31. Securities Industry Automation Corp., Dec. 1996: UNIX Vulnerabilities and Security Toolkit
32. Network Security, May 1996: UNIX Security: Threats and Solutions; Tools for UNIX Security; UNIX Security: Threats and Solutions from the Network; UNIX Security: Security in Programming
33. Los Alamos National Laboratories, Aug. 1996: UNIX Security: Security in Programming
34. USENIX, July 1996: UNIX Security Tools
35. UNIFORUM, May 1996: Advanced Topics in UNIX Security
36. SANS, May 1996: UNIX Security: Threats and Solutions; Tools for UNIX Security; UNIX Security: Threats and Solutions from the Network; UNIX Security: Security in Programming
37. SHARE, Mar. 1996: Advanced Topics in UNIX Security
38. USENIX, Jan. 1996: Advanced Topics in UNIX Security; UNIX Security Tools
39. LISA, Dec. 1995: UNIX System Security; UNIX Security: Threats and Solutions from the Network
40. Network Security, Nov. 1995: UNIX Security: Threats and Solutions; UNIX Security Tools: Use and Comparison
41. SANS, May 1995: UNIX Security: Threats and Solutions; Tools for UNIX Security; UNIX Security: Threats and Solutions from the Network; UNIX Security: Security in Programming
42. USENIX, Dec. 1994: Advanced Topics in UNIX Security
43. FedUNIX, Dec. 1994: Basic UNIX Security; Advanced UNIX Security; Tools for UNIX Security
44. USENIX, June 1994: Advanced Topics in UNIX Security
45. FedUNIX, June 1994: Basic UNIX Security; Advanced UNIX Security; Tools for UNIX Security
46. SANS-III, Apr. 1994: UNIX Security: Threats and Solutions; UNIX Security: Threats and Solutions from the Network; Writing Privileged Programs
47. USENIX, Jan. 1994: Topics in UNIX Security
48. FedUNIX, Dec. 1993: Introduction to UNIX Security; Advanced UNIX Security; Tools for UNIX Security
49. CERT Workshop on Computer Security Incident Handling, Aug. 1993: Advanced UNIX Security

- "Vulnerabilities Analysis," Dept. of Computer Science, Mississippi State University (Sep. 2003).
- "Auditing" and "Intrusion Detection" lectures for CS 526, Dept. of Computer Science and CERIAS, Purdue University Summer Institute (July 2003).
- "Thoughts on a Research Agenda," panel presentation, *Colloquium on Information System Security Education* (June 2003).
- "A Survey of Vulnerabilities," *IEEE/North American Taiwanese Engineers' Association* (Apr. 2003).
- "Computer Security and Policy," guest lecture in POL 132, University of California at Davis (May 2002).
- "Computer Security Education," *INFOTEC* (Apr. 2002).
- "Vulnerabilities and Sanitization," Georgia Institute of Technology (Nov. 2001).
- "Electronic Recordation and the Internet," panel presentation, *Real Estate Frauds Seminar, California District Attorneys Association* (2001).
- "Analysis of Computer Vulnerabilities," *NASA Jet Propulsion Laboratory* (2001).
- "Vulnerabilities Analysis," *SANS* (2001).
- "Security and Electronic Commerce," *Student Management Group*, Krannert School of Management, University of California at Davis (2001).
- "Trust and Security," *Linux Users' Group of Davis* (2001).
- "Go Port-Scan Yourself," *Information Security Awareness Forum*, Department of Information Technology, State of California (2000).
- "Adapting Formal Methods for Informal Use," *SANS Network Security* (2000).
- "ECS 153, Introduction to Computer Security," panel presentation, *National Colloquium on Information System Security Education* (1999).
- "Research in Intrusion Detection," *I4 Conference* (1999).
- "Results from Workshops on Intrusion Detection" (with S. Northcutt), *Network Security Conference* (1998)
- "Unlearned Lessons," panel presentation, *21st National Information Systems Security Conference* (1998).
- "The UC Davis Vulnerabilities Database," *SANS Conference* (1998)
- "Attacking the Internet Infrastructure," *SEARCH Conference* (1997)
- "Writing Safe Privileged Programs," *Network Security* (1997)
- "UNIX Security," *SHARE Conference* (1997).
- "Teaching Computer Security," *ACM Workshop on Computer Security Education* (1997)
- "Adventures in Hackery," *System Administration, Networking and Security Conference* (1996)
- "Top Ten Security Threats to a UNIX System and What to Do About Them," *SHARE 86* (1996); *Best Session Award*
- "Patch-and-Catch," *UNIFORUM 1996* (1996)
- "Research, Development, and Operations," *Defensive Information Warfare Symposium* (1995)
- "Intruders and UNIX," *Network Security* (1995)
- "An Overview of Computer Viruses in a Research Environment," *Fourth Annual Computer Virus and Security Conference* (1991)
- "Password Management," *COMPCON '91* (1991)
- "A Security Analysis of the NTP Protocol," *Sixth Annual Computer Security Conference Proceedings* (1990)

- Journal of Computer Security
- Journal of Microprocessors and Microsystems
- Software – Practice and Experience

Conferences, Symposia, and Workshops
- Annual Computer Security Applications Conference (ACSAC) (1996–2003)
- IEEE Infocom (2002)
- Research in Advances in Intrusion Detection (RAID) (1998–2003)
- Symposium on Network and Distributed System Security (SNDSS, NDSS) (1996–2000)
- WETICE Enterprise Security (2002–2004)

Funding Organizations (Reviews Only; See Below)
- National Research Foundation (South Africa)
- National Science Foundation
- Institute for Security Technology Studies, Dartmouth College

Other Reviews for Working Groups and Organizations
- *National Strategy for Critical Infrastructure Protection*, for the President's Critical Infrastructure Protection Board

Workshops and Funding Organization Panels

- Department of Homeland Security, Software Assurance Curriculum Workshop (Aug. 2004, Oct. 2004).
- National Science Foundation, Cyber Defense Exercise Planning Workshop (Feb. 2004).
- National Science Foundation/National Institute of Science and Technology, Invitational Workshop on Cybersecurity Workforce Needs Assessment and Educational Innovation (Aug. 2003).
- National Science Foundation, SBIR, Security: Anti-Terrorism (Sep. 2002).

Working Groups

- UC Davis Computer Security Laboratory representative to the Institute for Information Infrastructure Protection (I3P) (2002–*current*).
- Responsible Disclosure Task Force, National Infrastructure Assurance Council (2003).
- Distributed Systems Advisory Board (1986–1988).
- Privacy and Security Research Group, Internet Research Task Force (1985–1997).

University Committees and Service

University of California, Davis

University Committees
- Academic Computing Coordinating Council Educational Computing Subcommittee, chair (1999-2002)
- Instructional Space Advisory Group (1999-2002)
- Academic Computing Coordinating Council (1998-2002)
- Incident Response working group (1998-2002)
- Core Team of the Learning Environment Architecture Development (LEAD) Project (1998-2001)
- Minority Undergraduate Research Program in the Physical Sciences steering committee (1998-2002)

- Advisory Board for Web Site Development Certificate Program at UC Extension (1997-2002)
- Undergraduate Preparatory Committee (1994-1998)

Department of Computer Science
- Information Technology Committee (1993-*current*; chair 1994-1996, 1997-*current*)
- Industrial Relations Committee (2003-2004)
- Undergraduate Affairs Committee (1997-1999)
- Faculty Recruiting Committee (1996-1997)
- Industrial Affiliates Committee (1993-1994)

Dartmouth College

Department of Mathematics and Computer Science
- Advisor to computer science majors (1992-1993)
- Undergraduate Education Program Committee (1989-1993; chair 1992-1993)
- Graduate Admissions Committee (member, 1990-1991)
- Mellon Colloquium Committee (1987-1989; chair 1988-1989)

Personal

Programming Languages

APL, ASPOL, BASIC, C, FORTRAN, LISP, PASCAL, SNOBOL, Scheme; Assembly languages for LSI-11 and PDP-11, PDP-10, DECSystem-2050, VAX-11, MC680x0, MIPS R4000; Various little languages (*awk, sed, sh, etc.*); Various markup languages and meta-languages (SGML, HTML, XML)

Personal Interests

foreign languages, history (particularly classical history, religious history, history of England in the reign of Henry VIII), literature, games

- "Password Checking Techniques," *Second Invitational Workshop on Computer Security Incident Response* (1990)
- "Privacy-Enhanced Electronic Mail," *Student ACM Chapter, St. Michael's College* (1989)
- "Selling C Shells By the C Shore," IRIS Users' Group, *NASA Ames Research Center* (1985)
- "A Day in the Life of a UNIX User," *15th Virginia Computer Users' Conference* (1985)

Program Chairs and Committees

- Fourth World Conference on Information Security Education; program committee (2005)
- IEEE International Workshop on Enabling Technologies: Infrastructure for Collaborative Enterprises (WETICE); program committee (2004, 2005)
- Annual Computer Security Applications Conferences, student awards chair (1996–2000); program committee (1990, 1996–2000)
- Symposium on Networked and Distributed System Security, program co-chair (1997–1998); program committee (1996–2000)
- Workshop on Computer Misuse and Anomaly Detection III, workshop chair (1995); program committee (1993–1994)
- Winter 1993 USENIX Technical Conference (1993)
- CERT Workshop on Research in Incident Handling, working group chair for "Medium Term Issues in Incident Handling: Tools and Techniques" group (1992)
- Workshop on Foundations in Computer Security II (1992)
- Third USENIX UNIX Security Symposium; program committee (1992)
- Dartmouth Summer Institute on Issues and Obstacles in the Practical Implementation of Parallel Algorithms and the Use of Parallel Machines (1991)
- UNIX Security Workshop, workshop chair (1988, 1990)
- UNIX Security Workshop, workshop chair (1988)

Reviewer

Books
- Addison-Wesley Publishing Company
- Prentice-Hall, Inc.

Journals
- ACM Transactions on Computer Systems
- ACM Transactions on Programming Languages and Systems
- Communications of the ACM
- Computing Reviews
- Computing Surveys
- Computing Systems
- Information Processing Letters
- IEEE Computer
- IEEE Security and Privacy
- IEEE Software
- IEEE Transactions on Computers
- IEEE Transactions on Dependable and Secure Computing
- IEEE Transactions on Software Engineering
- International Journal of Information Security
- Journal of the ACM

50. Sun Users' Group, June 1993: Advanced UNIX Security
51. SANS-II, Apr. 1993: Introduction to UNIX Security; Advanced UNIX Security
52. USENIX, Jan. 1993: Advanced UNIX Security
53. FedUNIX, Dec. 1992: Introduction to UNIX Security; Advanced UNIX Security
54. Sun Users' Group, Dec. 1992: Advanced UNIX Security
55. World Conference on System Administration and Security, July 1992: Introduction to UNIX Security; Advanced UNIX Security
56. USENIX, June 1992: Advanced UNIX Security
57. USENIX, Jan. 1992: Introduction to UNIX Security
58. FedUNIX, Dec. 1991: Introduction to UNIX Security; Advanced UNIX Security; Computer Viruses, Trojan Horses, and Logic Bombs
59. EurOpen, Sep. 1991: Introduction to UNIX Security
60. USENIX, June 1991: Introduction to UNIX Security
61. FedSecurity, June 1991: Introduction to UNIX Security; Introduction to Network Security; Computer Viruses, Trojan Horses, and Logic Bombs
62. FedUNIX, Dec. 1990: Introduction to UNIX Security

Professional Service

Editorial Boards

- Journal of Computer Security (1988–*current*)
- IEEE Privacy and Security; also co-editor of the Education Department, with Prof. Deborah Frincke (2003–*current*)

International Board of Reviewers

- Computers and Security (1993–2004)

Keynote Addresses

- "Threats and Assurance," *Information Technology Workshop*, Department of Health and Human Services, State of California, Rancho Cordova, CA (Nov. 2003)
- "E-Business Security: Fact, Fiction, or Both?" *Information System Security Association*, Sacramento Chapter, Sacramento, CA (2001).
- "Academia and Education in Information Security: Four Years Later," *National Colloquium on INFOSEC System Security Education*, Washington, DC (2001)
- "The State of INFOSEC Education in Academia: Present and Future Directions," *National Colloquium on INFOSEC System Security Education*, Bethesda, MD (1997)

Invited Talks

- "A Survey of Vulnerabilities," NASA Jet Propulsion Laboratory (Mar. 2004).
- "Vulnerabilities Analysis," Dept. of Computer Science, Naval Postgraduate School (Dec. 2003).
- "Threats and Assurance," Dept. of Health and Human Services, State of California (Nov. 2003)
- "Vulnerabilities Analysis," Dept. of Computer Science, University of Maryland/Baltimore County (Sep. 2003).

2. COSC 88/188, *Cryptography and Data Security*, undergraduate/graduate class
3. COSC 88/188, *Computer System Security Seminar*, undergraduate/graduate class
4. COSC 88/188, *Computer System Security*, undergraduate/graduate class
5. COSC 85/185, *Mathematical Cryptography*, undergraduate/graduate class (co-taught with Jeff Shallitt)
6. COSC 58, *Operating Systems*, undergraduate class
7. COSC 37, *Computer Architecture*, undergraduate class
8. COSC 23, *Software Engineering*, undergraduate class

Tutorials

1. University of California Security Symposium, June 2003: Basic UNIX Security, Advanced UNIX Security
2. LISA, Nov. 2002: UNIX Security: Threats and Solutions
3. USENIX Security Symposium, Aug. 2002: UNIX Security: Threats and Solutions
4. USENIX, June 2002: UNIX Security: Threats and Solutions
5. SANS, Apr. 2002: How Attackers Break Programs, and How to Write Programs More Securely
6. LISA, Dec. 2001: UNIX Security: Threats and Solutions
7. SANS, May 2001: Basic UNIX Protection; UNIX Security Tools; How Attackers Break Programs, and How to Write Programs More Securely
8. Network Security, Nov. 2000: Basic UNIX Protection; UNIX Security Tools; How Attackers Break Programs, and How to Write Programs More Securely
9. Infidel Corp., Aug. 2000: How Attackers Break Programs, and How to Write Programs More Securely
10. GIAC, July 2000: UNIX Security Tools: Use and Comparison
11. USENIX, June 2000: UNIX Security Tools: Use and Comparison
12. SANS, May 2000: Basic UNIX Protection; UNIX Security Tools; How Attackers Break Programs, and How to Write Programs More Securely
13. ARCA Corporation, Mar. 2000: How Attackers Break Programs, and How to Write Programs More Securely
14. SANS Security, Dec. 1999: Basic UNIX Protection; UNIX Security Tools; How Attackers Break Programs, and How to Write Programs More Securely
15. LISA, Dec. 1999: UNIX Security Tools: Use and Comparison
16. Network Security, Nov. 1999: Basic UNIX Protection; UNIX Security Tools; How Attackers Break Programs, and How to Write Programs More Securely
17. USENIX Security Symposium, Aug. 1999: How Attackers Break Programs, and How to Write Programs More Securely
18. USENIX, June 1999: UNIX Security Tools
19. SANS, May 1999: Basic UNIX Protection; UNIX Security Tools; How Attackers Break Programs, and How to Write Programs More Securely
20. SANS Intrusion Detection, Feb. 1999: Basic UNIX Protection; UNIX Security Tools; How Attackers Break Programs, and How to Write Programs More Securely
21. USENIX, Dec. 1998: UNIX Security Tools
22. LISA, Dec. 1998: UNIX Security Tools

12. Sep. 1996 - Aug. 1997: *Testing Security Properties of Protocols and Their Implementations*, Department of INFOSEC Computer Security, National Security Agency; $96,312.00 [PI]

13. July 1996 - Oct. 1996: *Detection of Vulnerabilities*, SRI International; $16,568.00 [PI]

14. Aug. 1994 - June 1996: *Analysis of System Vulnerabilities*, Trident Data Systems, Inc.; $228,000.00 [PI]

15. July 1994 - Nov. 1995: *Distributed Auditing*, Lawrence Livermore National Laboratories; $98,000.00 [PI]

16. July 1994 - June 1995: *Remote Tutor Project: UNIX-to-DOS Interface*, Office of the Provost, University of California at Davis; $6,700 [co-PI with R. Walters]

17. June 1994 - June 1995: *Third Workshop on Future Directions in Computer Misuse and Anomaly Detection*, Office of INFOSEC Computer Security, National Security Agency; $60,000.00, and Air Force Information Warfare Center, $17,000 [co-PI with K. Levitt, B. Mukherjee, and T. Heberlein].

18. Sep. 1993 - Sep. 1997: *Towards a Tester's Assistant for Property-Based System Testing*, DARPA/ONR; $195,000 [co-PI with K. Levitt and R. Olsson]

19. Sep. 1993 - Mar. 1994: *Adding Mutual Authentication to DIDS*, Trident Data Systems, Inc.; $46,323.00 [PI]

20. June 1993 - June 1994: *Second Workshop on Future Directions in Computer Misuse and Anomaly Detection*, Office of INFOSEC Computer Security, National Security Agency; $60,000.00 [co-PI with K. Levitt, B. Mukherjee, and T. Heberlein].

21. July 1992 - June 1993: *Formal Model of Security Monitoring*, Office of INFOSEC Computer Security, National Security Agency; $58,502.00 [PI]

22. March 1992 - April 1992: *Workshop on Future Directions in Computer Misuse and Anomaly Detection*, Lawrence Livermore National Laboratories and Los Alamos National Laboratories; $65,000.00 [co-PI with K. Levitt, B. Mukherjee, G. Liepens, H. Vaccaro, J. Prommel, S. Smaha, and D. Mansur].

23. October 1989 - September 1992: *UNIX™ Password Security and Distributed Computation*, NASA Ames Research Center; $121,365.00 [PI]

24. June 1989 – August 1989: *Analyzing the UNIX™ Password Algorithm*, NECUSE; $2,500 [PI].

25. September 1987 – August 1989: *A Network System Administration System*, NASA Ames Research Center; $35, 807 [PI].

26. July 1987 – June 1990: *Applications of the Take-Grant Model and Authentication in Computer Systems*, Burke Research Initiation Award, Dartmouth College; $14,775 [PI].

27. October 1985 – September 1988: *Improving Computer Security*, NASA Ames Research Center [PI].

28. October 1984 – September 1986: *Graphics Workstation Research and Development for Numerical Aerodynamic Simulator*, NASA Ames Research Center [PI].

5. H. Schildt, *The Craft of C: Take-Charge Programming*, Osborne/McGraw-Hill (1992)
   in *Computing Reviews* **34**(11) pp. 572-573 (Nov. 1993)

6. P. A. Karger, M. E. Zurko, D. W. Bonin, A. H. Mason, and C. E. Kahn, "A Retrospective on the VAX VMM Security Kernel," *IEEE Transactions on Software Engineering* **SE-17**(11), pp. 1147-1165 (Nov. 1991)
   in *Computing Reviews* **34**(5) pp. 259-260 (May 1993)

7. D. Spuler, *Comprehensive C*, Prentice-Hall, Inc. (1992)
   in *Computing Reviews* **34**(4) pp. 292-292 (Apr. 1993)

8. Æ. Frisch, *Essential System Administration*, O'Reilly & Associates, Inc. (1991)
   in *Computing Reviews* **33**(9) pp. 481-482 (Sep. 1992)

9. Comparative Review of L. Ammeraal, *C for Programmers*, John Wiley & Sons, Inc. (1986); J. Gardner, *From C to C: an Introduction to ANSI Standard C*, Harcourt Brace Jovanovich (1989); R. Hutchison, *Programming Using the C Language*, McGraw-Hill, Inc. (1988); R. Johnsonbaugh and M. Kalin, *Applications Programming in C*, Macmillan Publishing Co., Inc. (1989); and K. Pugh, *C Language for Programmers: 2nd Edition*, Q. E. D. Information Sciences, Inc. (1989)
   in *Computing Reviews* **33**(3) pp. 137-139 (Mar. 1992)

10. S. Garfinkel and E. Spafford, *Practical UNIX Security*, O'Reilly and Associates, Inc. (1991)
    in *Computers and Security* **11**(2) pp. 135-136 (Apr. 1992)

11. K. W. Yu and T. L. Yu, "Data Encryption based upon Time Reversal Transformations, *The Computer Journal* **32**(3) pp. 241-245 (June 1989)
    in *Computing Reviews* **31**(3) p. 160-161 (Mar. 1990)

12. R. A. Finkel, *An Operating Systems Vade Mecum, 2nd Edition*, Prentice-Hall, Inc. (1988)
    in *Computing Reviews* **30**(11) p. 559 (Nov. 1989)

13. O. Goldreich, "Two Remarks Concerning the Goldwasser-Micali-Rivest Signature Scheme," *Advances in Cryptology—Proceedings of CRYPTO '86* pp. 104-110 (Aug. 1986)
    in *Computing Reviews* **30**(10) p. 533 (Oct. 1989)

14. J. Boyer, "Inferring Sequences Produced by Pseudo-Random Number Generators," *Journal of the ACM* **36**(1) pp. 129-141 (Jan. 1989)
    in *Computing Reviews* **30**(7) p. 366 (July 1989)

15. M. Bentley, *The Viewport Technician: A Guide to Portable Software Design*, Scott, Foresman & Co. (1988)
    in *Computing Reviews* **30**(3) pp. 130-131 (Mar. 1989)

16. P. Darnell and P. Margolis, *Software Engineering in C*, Springer-Verlag New York, Inc. (1988)
    in *Computing Reviews* **29**(7) pp. 343-344 (July 1988)

17. Kemal Efe, "A Proposed Solution to the Problem of Levels in Error-Message Generation," *Communications of the ACM* **30**(11), pp. 948-955 (Nov. 1987)
    in *Computing Reviews* **29**(5) p. 262 (May 1988)

18. K. Andreassen, *Computer Cryptology: Beyond Decoder Rings*, Prentice-Hall, Inc. (1987)
    in *Computing Reviews* **29**(3) p. 140 (Mar. 1988)

19. V. D. Gligor, C. S. Chandersekaran, L. J. Dotterer, M. S. Hecht, W.-D. Jiang, A. Johri, G. L. Luckenbaugh, and N. Vasudevan, "The Design and Implementation of Secure Xenix™," *IEEE*

113. M. Bishop, "A Security Analysis of Version 2 of the Network Time Protocol NTP: A Report to the Privacy and Security Research Group," PCS-TR91-154, Department of Mathematics and Computer Science, Dartmouth College (Feb. 1991).

114. M. Bishop, "Administrator's Guide to the Digital Signature Facility "Rover"," PCS-TR90-153, Department of Mathematics and Computer Science, Dartmouth College (August 1990).

115. M. Bishop, "A Proactive Password Checker," PCS-TR90-152, Department of Mathematics and Computer Science, Dartmouth College (June 1990).

116. M. Bishop, "Applying the Take-Grant Protection Model", PCS-TR90-151, Department of Mathematics and Computer Science, Dartmouth College (May 1990).

117. M. Bishop, "Theft of Information in the Take-Grant Protection Model", PCS-TR88-137 (revised), Department of Mathematics and Computer Science, Dartmouth College (May 1990).

118. M. Bishop, "Privacy-Enhanced Electronic Mail", PCS-TR90-150, Department of Mathematics and Computer Science, Dartmouth College (May 1990).

119. M. Bishop, "An Application of a Fast Data Encryption Standard Implementation", PCS-TR88-138, Department of Mathematics and Computer Science, Dartmouth College (Aug. 1988); *also appeared as* "A Fast Version of the DES and a Password Encryption Algorithm", TR 87.18 [revised], Research Institute for Advanced Computer Science (Aug. 1988).

120. M. Bishop, "Theft of Information in the Take-Grant Protection Model", PCS-TR88-137, Department of Mathematics and Computer Science, Dartmouth College (July 1988).

121. M. Bishop, "The Sharing of Rights and Information in a Capability-Based Protection System", PCS-TR88-136, Department of Mathematics and Computer Science, Dartmouth College (July 1988).

122. M. Bishop, "A Fast Version of the DES and a Password Encryption Algorithm", TR 87.18, Research Institute for Advanced Computer Science (July 1987).

123. M. Bishop, "A Mechanism for Sharing Accounts", TR 87.10, Research Institute for Advanced Computer Science (Apr. 1987).

124. M. Bishop, "The RIACS Mail System", TR 87.6, Research Institute for Advanced Computer Science (Feb. 1987).

125. M. Bishop, "Manual Pages for the IRIS *plot* Routines", RM 86.7, Research Institute for Advanced Computer Science (Sep. 1986).

126. M. Bishop, "Manual Pages for *mab* Format Files", RM 86.6, Research Institute for Advanced Computer Science (Sep. 1986).

127. M. Bishop, "Profiling under UNIX by Patching", TR 86.24, Research Institute for Advanced Computer Science (Oct. 1986).

128. M. Bishop, "A User's Guide to PEGS", TR 86.16, Research Institute for Advanced Computer Science (Sep. 1986).

129. M. Bishop, "Analyzing the Security of an Existing Computer System", TR 86.13, Research Institute for Advanced Computer Science (May 1986).

130. M. Bishop and B. Leiner, "Access Control and Privacy in Large Distributed Systems," TR 86.6, Research Institute for Advanced Computer Science (Mar. 1986).

74. M. Bishop, "Analyzing the Security of an Existing Computer System", *1986 Proceedings of the Fall Joint Computer Conference*, pp. 1115-1119 (Nov. 1986).

75. M. Bishop, "A Pauper's Callback Scheme," *Computers and Security* 5(2) pp. 141-144 (June 1986).

76. M. Bishop, "How To Write A Setuid Program", *Cray User Group Proceedings* pp. 110-111 (Spring 1986).

77. M. Bishop, "Hierarchical Take-Grant Protection Systems", *Proceedings of the Eighth Symposium in Operating Systems Principles*, pp. 107-123 (Dec. 1981).

78. M. Bishop and L. Snyder, "The Transfer of Information and Authority in a Protection System", *Proceedings of the Seventh Symposium in Operating Systems Principles*, pp. 45-54 (Dec. 1979).

Edited

79. M. Bishop, ed., *History of Computer Security Part I: A Collection Of Seminal Papers*, on CD and on the WWW (http://seclab.cs.ucdavis.edu/projects/history).

80. M. Bishop, S. Northcutt, and A. Paller, eds., *Proceedings of the UC Davis Intrusion Detection and Response Data Sharing Workshop*, SANS Institute, Bethesda, MD (July 1998).

81. M. Bishop, ed., *Proceedings of the Third Computer Misuse and Anomaly Detection Workshop*, Office of INFOSEC Computer Security, National Security Agency, Ft. Meade, MD (Jan. 1995).

82. M. Bishop, ed., special issue on "Security in Open Systems," *Computing Systems* 7(4) (Winter 1994).

83. M. Bishop, ed., *Proceedings of the Second Computer Misuse and Anomaly Detection Workshop*, Office of INFOSEC Computer Security, National Security Agency, Ft. Meade, MD (Sep. 1993).

Unrefereed Papers and Columns

84. M. Bishop, "Principles of Secure Programming: Applying Basic Security Principles to Programming," *submitted to Linux World*

85. D. Frincke and M. Bishop, "Joining the Security Education Community," *IEEE Security and Privacy* 2(5) pp. 61–63 (Sep. 2004).

86. D. Frincke and M. Bishop, "Back to School," *IEEE Security and Privacy* 2(4) pp. 54–56 (July 2004).

87. D. Frincke and M. Bishop, "Guarding the Castle Keep: Teaching with the Fortress Metaphor," *IEEE Security and Privacy* 2(3) pp. 32–35 (May 2004).

88. M. Bishop and D. Frincke, "Teaching Robust Programming" *IEEE Security and Privacy* 2(2) pp. 54–57 (Mar. 2004).

89. M. Bishop, "What is Computer Security?" *IEEE Security and Privacy* 1(1) pp. 67–69 (Jan. 2003).

90. M. Bishop, "Trends in Academic Research: Vulnerabilities Analysis and Intrusion Detection," *Computers and Security* 21(7) pp. 609–612 (2002).

91. M. Bishop, "Guest Editorial," *Computing Systems* 7(4) pp. v–vii (Winter 1994).

35. J. Hughes, T. Aura, and M. Bishop, "Using Conservation of Flow as a Security Mechanism in Network Protocols," *Proceedings of the 2000 IEEE Symposium on Security and Privacy* pp. 132-141 (May 2000).

36. M. Bishop, "What Do We Mean By 'Computer Security Education'?," *Proceedings of the 22nd National Information Systems Security Conference* p. 604 (Oct. 1999).

37. M. Bishop, "Vulnerabilities Analysis," *Recent Advances in Intrusion Detection* pp. 125–136 (Sep. 1999).

38. M. Bishop, S. Cheung, J. Frank, J. Hoagland, S. Samorodin, and C. Wee, "The Threat from the Net," *IEEE Spectrum.* **34**(8) pp. 56–63 (Aug. 1997); abridged as "Internet Attacks: How they Occur and How to Protect Against Them," *Engineering World* **8**(3) pp. 32-38 (June/July 1998).

39. G. Fink and M. Bishop, "Property Based Testing: A New Approach to Testing for Assurance," *ACM SIGSOFT Software Engineering Notes* **22**(4)pp. 74–80 (July 1997).

40. M. Bishop, "The State of INFOSEC Education in Academia: Present and Future Directions," keynote address, *Proceedings of the National Colloquium on Information System Security Education* pp. 19–33 (Apr. 1997).

41. P. Denning and M. Bishop, *Network and Data Security,* ACM Professional Knowledge Program, http://www.cne.gmu.edu/modules/acmpkp/security/map_frm.html (Mar. 1997).

42. M. Bishop, "Information Survivability, Security, and Fault Tolerance," *Proceedings of the Information Survivability Workshop,* paper #6 (Feb. 1997).

43. M. Bishop, "Teaching Computer Security," *Proceedings of the Workshop on Education in Computer Security* pp. 78–82 (Jan. 1997).

44. M. Bishop, "Conspiracy and Information Flow in the Take-Grant Protection Model," *Journal of Computer Security* **4**(4) pp. 331–359 (1996).

45. L. Heberlein and M. Bishop, "Attack Class: Address Spoofing," *Proceedings of the Nineteenth National Information Systems Security Conference* pp. 371–377 (Oct. 1996)

46. M. Bishop and L. Heberlein, "An Isolated Network for Research," *Proceedings of the Nineteenth National Information Systems Security Conference* pp. 349–360 (Oct. 1996).

47. M. Bishop and M. Dilger, "Checking for Race Conditions in File Accesses," *Computing Systems* **9**(2) pp. 131-152 (Spring 1996).

48. M. Bishop, "A Standard Audit Trail Format," *Proceedings of the Eighteenth National Information Systems Security Conference* pp. 136-145 (Oct. 1995).

49. M. Bishop and D. Klein, "Improving System Security Through Proactive Password Checking," *Computers and Security* **14**(3) pp. 233–249 (May/June 1995).

50. M. Bishop, "Theft of Information in the Take-Grant Protection Model," *Journal of Computer Security* **3**(4) pp. 283–309 (1994/1995).

51. M. Bishop, "Teaching Computer Security," *Proceedings of the Eighth International Conference on Information Security,* pp. 43-52 (May, 1993).

52. M. Bishop, "Recent Changes to Privacy-Enhanced Electronic Mail," *Journal of Internetworking: Research and Experience* **4**(1) pp. 47-59 (Mar. 1993).

53. M. Bishop, "Anatomy of a Proactive Password Checker," *Proceedings of the Third UNIX Security Symposium* pp. 130-139 (Sep. 1992).

4. M. Bishop, S. Cheung, J. Frank, J. Hoagland, S. Samorodin, and C. Wee, "Internet Security," Chapter 7 in *Statistical Methods in Computer Security*, by William Chen, Marcel Dekker, Inc., New York, NY (2004).

5. M. Bishop, "Computer Viruses," Article 6.45.6.3 in *Encyclopedia of Life Support Systems:Encyclopedia of Technology, Information, and Systems Management Resources*, Zainalabedin Nabavi and David Kaeli, eds., UNESCO, Geneva, Switzerland; http://www.eolss.net (2002).

6. M. Bishop, "Authentication," Chapter 7 in *UNIX Unleashed*, 4th Edition, by Andy Johnston and Robin Anderson, SAMS, Inc., Indianapolis, IN (2001); ISBN 0-672-32251-X.

Refereed Papers

7. M.. Bishop, "The Insider Problem Revisited," *submitted to the New Security Paradigms Workshop* (Apr. 2005).

8. S. Peisert, M. Bishop, S. Karin, and K. Marzullo, "Principles-Driven Forensic Analysis," *submitted to the New Security Paradigms Workshop* (Apr. 2005).

9. M. Bishop, "Teaching Context in Information Security," *submitted to the Journal on Educational Resources in Computing* (Apr. 2005).

10. J. Zhou, A. Carlson, and M. Bishop, "A Step From Network Intrusion Attempt Detection to Networtk Intrusion Detection," *submitted to the Symposium on Recent Advances in Intrusion Detection* (Apr. 2005).

11. M. Bishop, D. Howard, S. Engle, and S. Whalen, "A Taxonomy of Buffer Overflows," *submitted to the Symposium on Recent Advances in Intrusion Detection* (Apr. 2005).

12. D. Gilliam, J. Powell, and M. Bishop, "Application of Lightweight Formal Methods to Software Security," *submitted to the 14th IEEE International Workshop on Enabling Technologies: Infrastructure for Collaborative Enterprises (WETICE 2005)* (Mar. 2005).

13. S. Whalen and M. Bishop, "Layer 2 Authentication," *submitted to the IEEE Security and Privacy Magazine* (Feb. 2005).

14. M. Bishop, "Best Practices and Worst Assumptions," *to appear in the Proceedings of the Colloquium on Information Systems Security Education* (June 2005).

15. M. Bishop and H. Armstrong, "Uncovering Assumptions in Information Security," *to appear in the Proceedings of the Fourth World Conference on Information Security Education* (May 2005).

16. T. Walcott and M. Bishop, "Traducement: A Model for Record Security," *ACM Transactions on Information Systems Security* 7(4) pp. 576–590 (Nov. 2004).

17. M. Bishop, "Teaching Context in Information Security," *Proceedings of the Sixth Workshop on Education in Computer Security* pp. 29–35 (July 2004).

18. M. Bishop, B. Bhumiratana, R. Crawford, and K. Levitt, "How to Sanitize Data," *Proceedings of the 13th IEEE International Workshop on Enabling Technologies: Infrastructure for Collaborative Enterprises (WETICE 2004)* pp. 217–222 (June 2004).

19. R. Bajcsy, T. Benzel, M. Bishop, B. Braden, C. Brodley, S. Fahmy, S. Floyd, W. Hardaker, A. Joseph, G. Kesidis, K. Levitt, B. Lindell, P. Liu, D. Miller, R. Mundy, C. Neuman, R. Ostrenga, V. Paxson, P. Porras, C. Rosenberg, J. D. Tygar, S. Sastry, D. Sterne, and S. Wu,