

Dennis Heimbigner

Curriculum Vitae

Current Position

Research Associate Professor
Computer Science Department
University of Colorado
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Education

Ph.D. 1982. Computer Science, University of Southern California.

M.S. 1979. Computer Science, University of Southern California.

B.S. 1973. Mathematics, California Institute of Technology.

Professional Positions

1999-Present Research Associate Professor, University of Colorado.
1988-1999 Research Associate, Computer Science, University of Colorado.
1982-1988 Assistant Professor, Computer Science, University of Colorado.
1973-1982 Member of the Technical Staff, Northrup (was TRW) Aerospace,
Redondo Beach, CA.

Programming Background

Primary languages: Java, C, C++, Ada, Fortran77, Lisp, Prolog. I have also taught programming languages, so I have knowledge of a variety of languages.

Courses Taught

Web services, programming languages, database systems, operating systems, software engineering, distributed systems, Solaris internals.

Research Interests

- Software engineering: focusing on the application of traditional software engineering technology to the development of web services.
- New applications of secure hardware to security: focusing on trusted computing, especially including digital rights management (DRM).
- Autonomic computing: focusing on the application of planning and other AI techniques to the problem of automated self-reconfiguration of distributed systems.

Dissertation

Title: A Federated Architecture for Database Systems.
Advisor: Dennis McLeod
Date: August, 1982.

References

- Professor Leon Osterweil, Computer Science Department, University of Massachusetts, Amherst. Phone: 413-545-2186, Email: ljo@cs.umass.edu
- Professor Richard Taylor, Computer Science Department, University of Massachusetts, Amherst. Phone: 949-824-6429, Email: taylor@ics.uci.edu
- Professor Alexander Wolf, Computer Science Department, University of Colorado, Boulder. Email: alexander.wolf@colorado.edu
- Professor Kenneth Anderson, Computer Science Department, University of Colorado, Boulder. Phone: 303-492-6003, Email: kena@cs.colorado.edu

Selected Professional Activities

- Panel Reviewer for 2004, 2006, 2007 CyberTrust Program
- Program Committee for the 2nd Int'l Conf. on the Software Process
- Program Committee and Model Chair for the 7th Int'l Software Process Workshop
- Member of ACM, IEEE, Sigma XI

Awards

Recipient of AFOSR Critical Infrastructure Protection and Information Assurance Science and Engineering Augmentation Award for Fellows (CIPIAF) to spend one year at UC, Davis studying and researching in security for the period 6/1/01-5/31/02; Award: \$189,000.

Ph.D. Student Supervision

- Naveed Arshad, Ph.D., 2006, *A Planning-Based Approach to Failure Recovery in Distributed Systems*. Joint supervision with Professor Wolf.
- W. David Reese, Ph.D., 2001, An Investigation of Techniques for Integrating Web-accessible Data. Joint supervision with Professor Wolf.
- Richard S. Hall, Ph.D., 1999. *Agent-based Software Configuration and Deployment*. Joint supervision with Professor Wolf
- Mark J. Maybee, Ph.D., 1995, Component-object Interoperability in a Heterogeneous Distributed Environment. Joint Supervision with Professor Osterweil.
- Steven P. Levi, Ph.D., 1991. *Modeling the Configuration Management Process*. Joint supervision with Professors' Osterweil and Waite.
- Stanley M. Sutton Jr., Ph.D., 1990. *APPL/A: A Prototype Language for Software-Process Programming*. Joint supervision with Professor Osterweil.

Recent Sponsored Research

Title or Program	Agency	Duration	Award	Role
Mainstreaming Cybersecurity Research and Practice into Undergraduate Education	NSF	9/1/03-8/31/06	\$540,000	Co-PI
Event-based Document Sensing for Insider Threats	ARDA - NSA	6/01/03-5/31/05	\$749,971	Co-PI
Architectural Degradation Against Software Misuse	AFRL	10/1/02-12/31/03	\$325,481	PI
Faculty Fellowship in Support of Tolerating Intrusions Through Secure System Reconfiguration	AFOSR	6/1/01-5/31/02	\$189,000	Fellow
Hi-Dra	ARO	6/1/01-5/31//06	\$1,390,975	Co-PI
Application of Intrusion Tolerance Technology to JBI	AFRL	2001-2002	\$200,000	PI
Tolerating Intrusions Through Secure System Reconfiguration	DARPA	7/1/00-12/31/03	\$1,969,391	Co-PI
Definition, Deployment, and Use of Gauges to Manage Reconfigurable Component-Based Systems	DARPA	6/29/00-6/28/04	\$715,000	Co-PI
Sensor Operating System	DARPA	2000-2003	\$47,788	PI
Evolutionary Design of Complex Systems	AFRL	4/1/98-3/30/01	\$300,000	Co-PI
Arcadia 3: Wide-Area Software Engineering	DARPA	1994-2000	\$3,021,000	PI

Publications

Journal Papers in Submission

“A Tamper-Resistant Programming Language System,” D. Heimbigner. For submission to IEEE Transactions on Secure and Dependable Systems.

“Planning-Based Failure Recovery for Distributed Systems,” N. Arshad, D. Heimbigner, A. Wolf. For submission to ACM Transactions on Autonomous and Adaptive Systems.

Journal Publications

“Deployment and Dynamic Reconfiguration Planning for Distributed Systems,” N. Arshad, D. Heimbigner, and A.L. Wolf. Journal of Software Quality, Special Issue on Applications of Computational and Artificial Intelligence in Software Engineering (to appear).

“A Testbed for Configuration Management Policy Programming,” A. van der Hoek, A. Carzaniga, D. Heimbigner, and A. L. Wolf. IEEE Transactions on Software Engineering 28(1):79–99 (Jan.2002).

“An Architecture-Based Approach to Self-Adaptive Software,” P. Oreizy, M. Gorlick, R. N. Taylor, D. Heimbigner, G. Johnson, N. Medvidovic, A. Quilici, D. Rosenblum, and A. L. Wolf. IEEE Intelligent Systems Special Issue on Self-Adaptive Software, 14(3):54-62 (May/June 1999).

“Software Process Modeling and Execution within Virtual Environments,” J. Doppke, D. Heimbigner, and A. Wolf. ACM Transactions on Software Engineering 7(1):1-40 (January 1998).

“APPL/A: A Language for Software Process Programming,” S. M. Sutton, Jr., D. Heimbigner, and L. J. Osterweil. ACM Transactions on Software Engineering 4(3):221-286 (July 1995).

“A Toolkit for the Incremental Implementation of Heterogeneous Database Management Systems,” P. Drew, R. King, and D. Heimbigner. VLDB Journal 1(2): 241-284 (1992).

“A Federated System for Software Management,” D. Heimbigner. IEEE Database Engineering Special Issue on Federated Databases. September 1987.

“A Federated Architecture for Information Management,” D. Heimbigner and D. Mcleod. ACM Transaction on Office Information Systems 3(3):253-278 (July 1985).

Conference Publications

“Client-Side Deception Using Architectural Degradation,” D. Heimbigner, Proceedings of the 2005 International Conference on Security and Management, Las Vegas, NV, June 2005.

“Expressive and Efficient Peer-to-Peer Queries,” D. Heimbigner, Proceedings of the 2005 Hawaii International Conference on System Sciences (HICSS-38), Big Island, HA, 3-6 Jan., 2005.

“Managing Access Rights for Terminated Employees,” D. Heimbigner, Proceedings of the 2004 International Conference on Security and Management, Las Vegas, NV, June 2004.

“Deployment and Dynamic Reconfiguration Planning for Distributed Software Systems,” N. Arshad, D. Heimbigner and A. L. Wolf, Proceedings of the 15th IEEE International Conference on Tools with Artificial Intelligence, Sacramento, CA, November 2003.

“A Tamper-Detecting Implementation of Lisp,” D. Heimbigner, Proceedings of the 2003 International Conference on Security and Management, Las Vegas, NV, June 2003.

“Reconfiguration in the Enterprise JavaBean Component Model,” M.J. Rutherford, K. Anderson, A. Carzaniga, D. Heimbigner, and A.L. Wolf, Proceedings of IFIP/ACM Working Conference on Component Deployment, Berlin, Germany, June 2002.

“Achieving Survivability of Complex and Dynamic with the Willow Framework,” A. L. Wolf, D. Heimbigner, K. Anderson, A. Carzaniga, and N. Ryan. Proc. of the Working Conference on Complex and Dynamic Systems Architecture, Brisbane, Australia, December 2001.

“Adapting Publish/Subscribe Middleware to Achieve Gnutella-like Functionality,” D. Heimbigner. 2001 ACM Symposium on Applied Computing (SAC 2001): Special Track on Coordination Models, Languages and Applications pp. 176–181, 11-14 March 2001, Las Vegas, NV.

“A Framework for Analyzing Configurations of Deployable Software Systems,” D. Heimbigner, R.S. Hall, and A.L. Wolf. Proc. of the Fifth IEEE Int’l Conference on Engineering of Complex Computer Systems, pp. 32–42. Las Vegas, NV, October 1999.

“A Cooperative Approach to Support Software Deployment Using the Software Dock,” R. Hall, D. Heimbigner, and A. L. Wolf. Proc. of ICSE’99: The 1999 Int’l Conf. on Software Engineering, pp. 174-183. Los Angeles, CA, May 1999.

“Evaluating Software Deployment Languages and Schema: An Experience Report,” R. Hall, D. Heimbigner, and A. L. Wolf. Proc. of the 1998 Int’l Conf. on Software Maintenance. Bethesda, MD, November 1998.

“Software Release Management,” A. van der Hoek, R. S. Hall, D. Heimbigner, and A. L. Wolf. Sixth European Software Engineering Conference. Sept. 1997, Zurich, Switzerland.

“An Architecture for Post-Development Configuration Management in a Wide-Area Network,” R. S. Hall, D. Heimbigner, A. van der Hoek, and A. L. Wolf. Proc. of the 17th Int’l Conf. on Distributed Computing Systems. Baltimore, MD, May 1997.

“Language-Based Support for Metadata,” J. Doppke, D. Heimbigner, and A.L. Wolf. First IEEE Metadata Conference. Silver Spring, MD, April 1996.

“A Generic, Peer-to-Peer Repository for Distributed Configuration Management,” A. van der Hoek, D. Heimbigner, and A. L. Wolf. Proc. of the 18th Int’l Conf. on Software Engineering. Berlin, FRG, March 1996.

“Multilanguage Interoperability in Distributed Systems: Experience Report,” M. Maybee, D. Heimbigner, and L. J. Osterweil. Proc. of the 18th Int’l Conf. on Software Engineering. Berlin, FRG, March 1996.

“The ProcessWall: A Process State Server Approach to Process Programming,” D. Heimbigner. Fifth ACM/SIGSOFT Conf. on Software Development Environments. Washington, D.C., December 1992.

“Issues Encountered in Building a Flexible Software Development Environment: Lessons from the Arcadia Project,” R. Kadia (pseudonym for Arcadia Consortium Investigators), Proc. of ACM SIGSOFT Fifth Symposium on Software Development Environments, pp. 169–180. Tyson’s Corner, VA, December, 1992.

“Experiences with an Object Manager for a Process-Centered Environment,” D. Heimbigner. Proc. of the 18th Int’l Conf. on Very Large Databases (VLDB92). Vancouver, B.C., August 1992.

“Programming a Software Requirements Specification Process,” H. Ziv, S. M. Sutton Jr., Xi. Song, H. Yessayan, M. Maybee, D. Heimbigner, and L. Osterweil. First Int’l Conf. on the Software Process. Redondo Beach, CA, October 1991.

“Language Constructs for Managing Change in Process-Centered Environments,” S. M. Sutton Jr., D. Heimbigner, and L. Osterweil. Fourth ACM/SIGSOFT Conf. on Software Development Environments. Irvine, CA, December 1990.

“A Graph Transform Model for Configuration Management Environments,” D. Heimbigner and S. Krane (Levi). Proc. of the Third ACM-SIGSOFT Symposium on Software Development Environments, pp. 216–225. Boston, MA, November 1988.

“Keystone: A Federated Software Environment,” G. Clemm, D. Heimbigner, L. Williams, and L. Osterweil. ACM SIGPLAN 85 Symposium on Programming Languages and Programming Environments, pp. 80–88. Harwichport, MA, June 1985.

“Idd: An Interactive Distributed Debugger,” P. Harter, D. Heimbigner, and R. King. Proc. of the 5th IEEE Int’l Conf. on Distributed Computing Systems, pp. 498–506. Denver, CO, May 1985.

“Towards an Integrated Environment for Accessing External Databases,” D. Heimbigner. Proc. of the Second ACM-SIGOA Conf. on Office Information Systems. Toronto, Canada, June 1984.

“A Multi-Processing Implementation-Oriented Formal Definition of Ada in SEMANOL,” F. Belz, E. Blum, and D. Heimbigner, Proc. of the ACM-SIGPLAN Symposium on the Ada Programming Language. Boston, MA, December 1980.

Workshop Publications

“Dealing with Failures during Failure Recovery of Distributed Systems,” N. Arshad, D. Heimbigner, and A. Wolf, Proceedings of the Workshop on Design and Evolution of Autonomic Application Software (DEAS’05), St. Louis, MI, 21 May 2005.

“A Planning Based Approach to Failure Recovery in Distributed Systems,” N. Arshad, D. Heimbigner, A. Wolf, Proceedings of the ACM SIGSOFT Workshop on Self-Managed Systems (WOSS’04), Newport Beach, CA, 31 Oct. – 1 Nov. 2004.

“DMTF - CIM to OWL: A Case Study in Ontology Conversion,” D. Heimbigner, Ontology in Action Workshop in conjunction with the 2004 Conference on Software Engineering and Knowledge Engineering (SEKE’04), Banff, Alberta Canada, June 21, 2004.

“Common Issues for Remote Analysis and Adaptive Security,” D. Heimbigner, 2nd Int’l Workshop on Remote Analysis and Measurement of Software Systems (RAMSS’04), Edinburgh, Scotland, May 24, 2004.

“The Willow Survivability Architecture,” J. Knight, D. Heimbigner, A. Wolf, A. Carzaniga, J. Hill, and P. Devanbu. Proc. of the Fourth Information Survivability Workshop (ISW2001), 18-20 March 2002, Vancouver, B.C.

“Pulling it all together with WIT: A tool for integrating Web-based Information,” W. D. Reese, D. Heimbigner, A. Wolf. International Workshop on Information Integration on the Web (WIIW 2001). 9-11 April 2001, Rio de Janeiro, Brazil.

“Bend, Don’t Break: Using Reconfiguration to Achieve Survivability,” A. Wolf, D. Heimbigner, A. Carzaniga, J. Knight, P. Devanbu, and M. Gertz. Proc. of the Third Information Survivability Workshop (ISW-2000) pp. 187–190, Boston, MASS, 24-26 October 2000.

“Versioned Software Architecture,” A. van der Hoek, D. Heimbigner, and A. L. Wolf. Proc. of the 3rd Int’l Software Architecture Workshop. Orlando, FLA, November, 1998.

“Requirements for Software Deployment Languages,” R. Hall, D. Heimbigner, and A. L. Wolf. Proc. of the 8th Int’l Software Configuration Management Workshop. Brussels, Belgium, July 1998. Springer-Verlag Lecture Notes in Computer Science, number 1439.

"System Modeling Resurrected," A. van der Hoek, D. Heimbigner, and A. L. Wolf. Proc. of the 8th Int'l Software Configuration Management Workshop. Brussels, Belgium, July 1998. Lecture Notes in Computer Science, number 1439.

"Does Configuration Management Research Have a Future?" A. van der Hoek, D. Heimbigner, and A. L. Wolf. Proc. of the 5th Int'l Software Configuration Management Workshop. Seattle, WA, April 1995.

"An Argument for the Elimination of Roles," D. Heimbigner and L. J. Osterweil. Proc. of the Ninth Int'l Software Process Workshop, pp. 95-97. Reston, VA, USA, October 1994. IEEE Computer Society Press, C. Ghezzi, Ed.

"A Revisionist Approach to Process Change," D. Heimbigner. Proc. of the Eighth Int'l Software Process Workshop, pp. 95-97. Wadern, Schloss Dagstuhl, Germany, March 1993. IEEE Computer Society Press, W. Schäfer, Ed.

"A Process Server," D. Heimbigner. Proc. of the Seventh Int'l Software Process Workshop, pp. 65-66. Yountville, CA, October 1991. IEEE Computer Society Press, W. Riddle, Ed.

"Proscription versus Prescription in Process Centered Environments," D. Heimbigner. Proc. of the Sixth Int'l Software Process Workshop, pp. 99-102. Hakodate, Japan, October, 1990. IEEE Computer Society Press, Takuya Katayama, Ed.

"P⁴: A Logic Language for Process Programming," D. Heimbigner. Proc. of the Fifth Int'l Software Process Workshop. Kennebunkport, ME, September 1989.

"Object Management Issues for Software-Process Programming Languages," S. M. Sutton Jr. and D. Heimbigner. Proc. of the 1989 ACM SIGMOD Workshop on Software CAD Databases. Napa, CA, February 1989.

"Towards a Graph Transform Model for Configuration Management Environments," Steven Levi and D. Heimbigner. Proc. of the Int'l Workshop on Software Version and Configuration Control. Grassau, FRG, January 1988. Edited by Jurgen F. H. Winkler.

Miscellaneous Articles

"Software Deployment: Extending Configuration Management Support into the Field," A. van der Hoek, R.S. Hall, A. Carzaniga, D. Heimbigner, and A.L. Wolf. Crosstalk, The Journal of Defense Software Engineering 11(2) (February 1998).

Recent Technical Reports

“Fine Grain Spam Suppression Using Reachback,” D. Heimbigner. Department of Computer Science Technical Report CU-CS-1016-06, University of Colorado, November 2006.

“A Tamper-Resistant Programming Language System,” D. Heimbigner. Department of Computer Science Technical Report CU-CS-1010-06, University of Colorado, June 2006.

“Dealing with Failures During Failure Recovery of Distributed Systems,” N. Arshad, D. Heimbigner, and A. Wolf. Department of Computer Science Technical Report CU-CS-1009-06, University of Colorado, May 2006.

“A Comparison of Planning Based Models for Component Reconfiguration,” N. Arshad and D. Heimbigner. Department of Computer Science Technical Report CU-CS-995-05, University of Colorado, April 2005.

“Event-based Document Sensing for Insider Threats,” K. Anderson, A. Carzaniga, D. Heimbigner and A. Wolf. Department of Computer Science Technical Report CU-CS-968-04, University of Colorado, February 2004.

“An Efficient Implementation of Query/Advertise,” D. Heimbigner, Department of Computer Science Technical Report CU-CS-948-03, University of Colorado, March 2003.

“Extending the Siena Publish/Subscribe Type System,” D. Heimbigner, Department of Computer Science Technical Report CU-CS-946-03, University of Col University of Colorado, March 2003.

“Intrusion Management Using Configurable Architecture Models,” D. Heimbigner and A. Wolf, Department of Computer Science Technical Report CU-CS-929-02, University of Colorado, May 2002.

“The Willow Architecture: Comprehensive Survivability for Large-Scale Distributed Applications,” J. Knight, D. Heimbigner, A. Wolf, A. Carzaniga, J. Hill, P. Devanbu and M. Gertz. Department of Computer Science Technical Report CU-CS-926-01, University of Colorado, December 2001.

“Adapting a Publish/Subscribe Middleware to Achieve Gnutella-like Functionality,” D. Heimbigner. Department of Computer Science Technical Report CU-CS-909-00, University of Colorado, 2000.