



Curriculum Vitae

University of California, Santa Cruz

December 31, 2015

Charles McDowell

Professor

Computer Science Department

Biobib last revised: 9/15/2014

EMPLOYMENT HISTORY

- 2006 - Present Associate Dean for Undergraduate Affairs, School of Engineering, University of California, Santa Cruz
- 1998 - Present Professor, Computer Science, University of California, Santa Cruz
- 1991 - 1997 Department Chair, Computer Science, University of California, Santa Cruz
- 1990 - 1998 Associate Professor, Computer Science, University of California, Santa Cruz
- 1985 - 1990 Assistant Professor, Computer and Information Sciences, University of California, Santa Cruz
- 1984 - 1985 Consultant to JRS Research. Consultant to Los Alamos National Laboratory
- 1983 - 1985 Visiting Assistant Professor, Dept of Electrical Engineering and Computer Science, University of California, San Diego
- 1982 - 1983 Associate in Computer Science, Dept of Electrical Engineering and Computer Science, University of California, San Diego
- 1982 - 1983 Associate in Computer Science, Dept of Electrical Engineering and Computer Science, University of California, San Diego
- 1982 - 1982 Consultant, Linkabit Corporation
- 1982 - 1982 Teaching Assistant, Dept of Electrical Engineering and Computer Science. Consultant to Digital Equipment Corporation, University of California, San Diego
- 1977 - 1980 Teaching Assistant, Dept of Electrical Engineering and Computer Science, Consultant to Digital Equipment Corporation, University of California, San Diego
- 1977 - 1980 Senior Engineer, Digital Equipment Corporation, Tewksbury, MA
- 1974 - 1977 Computer Scientist, Lawrence Livermore Laboratory, Livermore, CA

EDUCATION

- 1983 Ph.D., Computer Science, University of California, San Diego, 1983
- 1981 M.S., Computer Science, University of California, San Diego, 1981
- 1974 B.S., Computer Science and Applied Mathematics, California Polytechnic State University, San Luis Obispo, 1974

HONORS AND AWARDS

- 2001 **Award:** UCSC Committee on Teaching, "Excellence in Teaching Award"
- 2001 **Scholarship:** Carnegie Foundation, "Carnegie Scholar at the Carnegie Academy for the Scholarship of Teaching and Learning"
- 1999 **Award:** Honorable Mention in the first JavaWorld Code Masters Challenge, http://www.javaworld.com/javaworld/codemasters/codemasters_winner1.html.

- 1999 **Honorary Society:** Phi Kappa Phi
 1986 **Fellowship:** UC Regents Junior Faculty Fellowship
 1980 **Fellowship:** UC Regents Fellowship

GRANTS

- 2014 Girls in Engineering, Baskin Foundation \$25,000
 2013 - 2014 Girls in Engineering, Baskin Foundation and eBay \$50,000
 NCWIT Extensions Services Mini Grant: Project Awesome \$8,000
 2012 - 2014 eBay Inspire Scholarships \$96,200
 2012 Girls In Engineering, Baskin Foundation and eBay \$50,000
 2008 - 2013 NSF S-STEM Grant, "Assisting CS, CE, and EE Student Success (ACCESS)." (PI with co-PIs F.J. Ferguson, A.D. Harrell, J. Kubby, and T. Larrabee). \$597,999
 2007 - 2008 Microsoft, "Enhancing CS1 and a CS Gateway Course at UCSC with Computer Game Projects." (co-PI with J. Whitehead) \$61,000
 2005 - 2006 Hewlett-Packard, "Technology for Teaching." Co-PI with 5 others. \$73,500
 2004 - 2006 NSF, "Virtual Pair Programming in Undergraduate Education." \$59,962
 2004 - Present Hierarchical Systems Research Foundation, "Cluster Computing." Long term loan of Apple G5 cluster. \$150,000
 2004 - 2005 NSF, "Retaining Women in Computer Science Programs: The Impact of Pair-Programming." Supplement to previous award, co-pi with Linda Werner and Heather Bullock. \$45,421
 2003 - 2006 Hierarchical Systems Research Foundation, "Simulations Involving Multiple Time Scales." \$7,220
 2000 - 2003 NSF, "Retaining Women in Computer Science Programs: The Impact of Pair-Programming." Co-pi with Linda Werner and Heather Bullock. \$236,799
 2000 National Semiconductor Gift, "Human Assisted Extraction of Specifications from Data Sheets." \$10,000
 1998 - 2000 UC-MICRO, National Semiconductor Corp. and Bay Networks, "Building Embedded Java Systems." \$95,093
 1997 - 1998 UC-MICRO and National Semiconductor Corp., "An Intelligent Electronic Assistant." Co-pi with David Helmbold. \$67,776
 1997 National Semiconductor Gift, "Embedded Java." \$6,000
 1996 - 1997 UC-MICRO and National Semiconductor Corp., "Improving Embedded Computer Software Development." \$78,584
 1996 National Semiconductor Gift, "Embedded Java." \$30,000
 1994 - 1995 Instructional Improvement Grant, "Improving Undergraduate Software Development Tools." \$3,000
 1991 - 1993 NSF, "Tools for Understanding and Debugging Parallel Programs." \$200,000
 1989 - 1990 UC GSR Seed Funds, "Shared Distributed Objects." \$12,500
 1989 - 1990 IBM, "Structure and Trace Analysis of Parallel Programs." \$230,000
 1988 - 1989 LANL., "START: Static Anomaly Reporting Tool." \$20,000
 1987 - 1988 IBM, "A Survey of Techniques for Debugging Parallel Programs." \$35,000
 1987 - 1988 LANL, "Static Analysis of Parallel Programs for Anomaly Detection." \$20,000

PUBLICATIONS AND SCHOLARLY WORK**Books**

- 2006 Pohl, I. and C. E. McDowell, *Java by Dissection*, self-published Second Edition, distributed by LuLu.com.
 2000 Pohl, I. and C. E. McDowell, *Java by Dissection*, Addison-Wesley-Longman
 2000 *On to C: A Primer to Accompany Java by Dissection*, Addison-Wesley-Longman Also available as an e-book under the title *C for Java Programmers: A Primer*

Contributions to Books

- 2002 "Balancing Pedagogic Needs with the Needs of a Classroom Experiment," in Pat Hutchings ed., *Ethics of Inquiry: Issues in the Scholarship of Teaching and Learning*, The Carnegie Foundation for the Advancement of Teaching

- 1996 Helmbold, D.P. and C.E. McDowell, "Race Detection - Ten Years Later," *Debugging and Performance Tuning for Parallel Computing Systems*, IEEE Computer Society Press
- 1991 Appelbe, W.F., C.E. McDowell, and K. Smith, "Interactive Tools for Developing Parallel Fortran Application Programs," in Harry Tyrer ed., *Advances in Distributed and Parallel Processing*, Ablex Publishing

Journal Articles

- 2013 Werner, L., C. McDowell, and J. Denner, "A first step in learning analytics: pre-processing low-level Alice logging data of middle school students" *JEDM-Journal of Educational Data Mining* 5:2 pp11-37 (2013)
- 2006 McDowell, C., L. Werner, H.E. Bullock, J. Fernald, "Pair Programming Improves Student Retention, Confidence, and Program Quality" *Communications of the ACM* 49:8 (August 2006).
- 2005 Werner, L., B. Hanks, C. McDowell, H. Bullock, J. Fernald, "Want to Increase Retention of Your Female Students?," *Computing Research News* 17:2 (March). Actual publication date April, 2005.
- 2004 Werner, L., B. Hanks, C. McDowell, "Pair-programming helps female computer science students," *ACM Journal of Educational Resources in Computing* 4:1 (March). Actual publication date April, 2005
- 1998 McDowell, C.E., M.R. Allen, E.A. Baldwin, B.R. Montague and M. Montoreano, "JavaCam: Trimming Java Down to Size," *IEEE Internet Computing* (May/June).
- 1997 Montague, B.R. and C.E. McDowell, "Synchronous/Reactive Programming of Concurrent System Software," *Software Practice and Experience* (March).
- 1996 Helmbold, D.P. and C.E. McDowell, "A Taxonomy of Race Conditions," *Journal of Parallel and Distributed Computing* (March).
- 1993 Copperman, M. and C.E. McDowell, "A Further Note on Hennessy's `Symbolic Debugging of Optimized Code," *TOPLAS* (April). Also University of California Technical Report UCSC-CRL-91-04
- 1993 Helmbold, D.P., C.E. McDowell and J-Z Wang, "Determining Possible Event Orders by Analyzing Sequential Traces," *IEEE Transactions on Parallel and Distributed Computing* (June).
- 1990 Helmbold, D.P., and C.E. McDowell, "Modeling Speedup(n) Greater Than n," *IEEE Transactions on Parallel and Distributed Systems* (April).
- 1989 McDowell, C.E. and D.P. Helmbold, "Debugging Concurrent Programs," *ACM Computing Surveys* 21:4 (December), pp 593--622. Selected for translation into Japanese to appear in a special April 1991 issue of *bit* entitled "Computer Science `89." Reprinted in *Monitoring and Debugging of Distributed Real-Time Systems*, pp.25--54, J.J.P. Tsai and S.J.H. Yang Editors, IEEE Computer Society Press.
- 1989 Appelbe, W.F., C.E. McDowell, and K. Smith, "START/PAT: A Toolkit for Developing Parallel Programs," *IEEE Software* 6:4 (June), 29-38.
- 1989 "A Practical Algorithm for Static Analysis of Parallel Programs," *Journal of Parallel and Distributed Computing* (June). Also available as Technical Report UCSC-CRL-87-23, University of California, Computer Research Laboratory
- 1986 Appelbe, W.F. and C.E. McDowell, "Processor Scheduling for Linearly Connected Parallel Processors," *IEEE Transaction on Computers* c-25:7 (July), 632-638.
- 1982 "Protection at the Micromachine Level," *Computer Architecture News* 10:1 (March), 4-8.
- 1976 Marx, K.D., T.J. Dolan, R.W. Moir, and C.E. McDowell, "Trapping Rates and Loss Rates for Electrons in an Electrostatically Plugged Cusp," *The Bulletin of the American Physics Society* 21, 1044.

Papers in Conference Proceedings

- 2013 Werner, L., C. McDowell, and J. Denner. "Middle school students using Alice: what can we learn from logging data?" *Proceeding of the 44th ACM technical symposium on Computer science education (SIGCSE '13)*. ACM, New York, NY, USA, 507-512. DOI=10.1145/2445196.2445347
- 2009 Barker, L., C. McDowell, and K. Kalahar, "Exploring Factors that Influence Computer Science Introductory Course Students to Persist in the Major," *SIGCSE 2009*, March
- 2009 McDowell, C.E., A. Harrell, "Easing the Transition from the Community College to the Four-Year University," *ASEE Annual Conference 2009*, June
- 2005 Doshay, D., C. McDowell, "SlugGo: A Computer Go Program" *The 3rd International Conference on Baduk*, October.
- 2004 Hanks, B., C. McDowell, D. Draper, M. Krnjajic, "Program Quality with Pair Programming in CS1," *ITiCSE*, July.
- 2003 Williams, L., C. McDowell, N. Nagappan, J. Fernald, and L. Werner, "Building Pair Programming

- Knowledge through a Family of Experiments," *ISESE 2003*, September.
- 2003 McDowell, C.E., B. Hanks, and L. Werner, "Experimenting with Pair Programming in the Classroom," *ITiCSE 2003*, July.
- 2003 McDowell, C.E., H. Bullock, J. Fernald, and L. Werner, "The Impact of Pair Programming on Student Performance, Perception and Persistence," *ICSE 2003*, May.
- 2002 McDowell, C.E., H. Bullock, J. Fernald, and L. Werner, "The Effects of Pair-Programming on Performance in an Introductory Programming Course," *SIGCSE 2002*, March.
- 2002 Bevan, J., C.E. McDowell, and L. Werner, "Guidelines for the Use of Pair Programming in a Freshman Programming Course," *CSEET 2002*, February.
- 2000 McDowell, C.E. and K. Shankari, "Connecting non-Java devices to a Jini Network," *TOOLS Europe 2000*, June.
- 2000 Jun, Y-K. and C.E. McDowell, "Scalable Monitoring Technique for Detecting Races in Parallel Programs," *5th International Workshop on High-Level Parallel Programming Models and Supportive Environments. LNCS*, Springer-Verlag, 1800 (May). Proceedings published as *Parallel and Distributed Processing*
- 1999 Coldewey, Dirk and C.E. McDowell, "Prefetching Linked Data Structures," *Proceedings of the 17th IASTED International Conference*, February.
- 1997 Montague, B.R., M.R. Allen, E.A. Baldwin, M. Montoreano, and C.E. McDowell, "Design and Implementation of an Embedded-Java Web-Camera," *Workshop on Embedded Web/CORBA/Agent/Internet Technologies*, April.
- 1996 Helmbold, D.P. and C.E. McDowell, "A Class of Synchronization Operations that Permit Efficient Race Detection," *Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications*, August.
- 1996 Jun, Y-K. and C.E. McDowell, "On-the-fly Detection of the First Races in Programs with Nested Parallelism," *Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications*, August.
- 1991 Helmbold, D.P. and C.E. McDowell, "Computing Reachable States of Parallel Programs," *Workshop on Parallel and Distributed Debugging, ACM SIGPLAN Notices*, December.
- 1991 Helmbold, D.P., C.E. McDowell and J-Z. Wang, "Detecting Data Races from Sequential Traces," *1991 Hawaii International Conference on System Sciences*
- 1990 Helmbold, D.P., C.E. McDowell and J-Z. Wang, "Analyzing Traces with Anonymous Synchronization," *Proceedings, International Conference on Parallel Processing*, August.
- 1989 Helmbold, D.P., and C.E. McDowell, "Modeling Speedup(n) Greater Than n," *Proceedings International Conference on Parallel Processing*, August.
- 1988 "Viewing Anomalous States in Parallel Programs," *Proceedings, International Conference on Parallel Processing*, August.
- 1988 Appelbe, W.F. and C.E. McDowell, "Integrating Tools for Debugging and Developing Multitasking Programs," *Workshop on Parallel and Distributed Debugging*, May.
- 1988 Appelbe, W.F. and C.E. McDowell, "Developing Multitasking Applications Programs," *Proceedings, Hawaii International Conference on System Sciences*, January.
- 1987 Appelbe, W.F. and C.E. McDowell, "Minimizing the Complexity of Static Analysis of Parallel Programs," *Proc. Hawaii International Conference on System Sciences*, January.
- 1985 Appelbe, W.F. and C.E. McDowell, "Anomaly Reporting - a Tool for Debugging and Developing Parallel Numerical Algorithms," *Proceedings First International Conference on Supercomputing Systems*, December.
- 1983 "A Simple Architecture for Low-Level Parallelism," *Proc. International Conference on Parallel Processing*, August.
- 1983 Appelbe, W.F. and C.E. McDowell, "A Simple Multiprocessor Architecture," *Conference Record Mini/Micro West*, November.
- 1977 Rousseau, W.F., C.E. McDowell, S.S. Sussman, and V. Waluch, "General Economic Modeling System," *Proceedings of the Lawrence Symposium on System and Decision Sciences*. October. Berkeley, CA
- 1976 Marx, K.D., R.W. Moir, W.L. Barr and C.E. McDowell, "Monte Carlo Calculation of Collisional Effects in a Mirror-Confined Plasma," *Proceedings of the Annual Meeting on Theoretical Aspects of Controlled Thermonuclear Research*. Madison, Wisconsin, April 7-9.
- 1975 Fink, J.H. and C.E. McDowell, "Ionization, Charge Exchange, and Secondary Electron Emission in the Extractor of an LBL/LLL Neutral Beam Source," *Proceedings of the Sixth Symposium on Engineering Problems of Fusion Research*. San Diego, CA, November 18-21.

Other Publications

- 2013 Leo Porter, Mark Guzdial, Charlie McDowell, and Beth Simon. "Success in introductory programming: what works?". *Commun. ACM* 56, 8 (August 2013), 34-36.
DOI=10.1145/2492007.2492020
- 2006 "Tablets in a Modern Multi-media Classroom," *2006 HP Technology for Teaching Worldwide Higher Education Conference*, February. Monterey, California.
- 2005 McDowell, C.E., L. Werner "Pair Programming and Retention: Significant findings regarding computer science major retention when pair programming is used in introductory programming courses," *SIGCSE 2005*
- 1998 "Reducing garbage in Java", *Sigplan Notices*, September.
- 1998 Ladusaw, W., C. E. McDowell, D. Murphy, J. A. Roeth, F. Siff "UCSC Nettrail"
<http://nettrail.ucsc.edu>.
- 1997 McDowell, C.E., M.R. Allen, E.A. Baldwin, B.R. Montague and M. Montoreano "Trimming Java Down to Size," *Technical Report UCSC-CRL-97-22*
- 1994 Helmbold, D.P. and C.E. McDowell "A Taxonomy of Race Detection Algorithms," *Technical Report, UCSC-CRL-94-35*
- 1993 Helmbold, D.P. and C.E. McDowell "What is a Race in a Program and When Can We Detect It?," *Technical Report UCSC-CRL-93-30*
- 1993 Becher, J.D. and C.E. McDowell "Debugging the MP-2001," *Postproceedings of The New Frontiers: A Workshop on Future Directions of Massively Parallel Processing*
- 1992 Helmbold, D.P., C.E. McDowell, and T. Haining "Analyzing Traces of Parallel Programs Containing Semaphore Synchronization," *Supercomputer Debugging Workshop '92*
- 1991 Copperman, M. and C.E. McDowell "Debugging Optimized Code Without Surprises," *Supercomputer Debugging Workshop '91*
- 1991 Helmbold, D.P. and C.E. McDowell "Computing Reachable States of Parallel Programs," *Technical Report UCSC-CRL-90-58 a longer version of the 1991 Workshop on Parallel and Distributed Debugging workshop paper with the same title*
- 1990 Helmbold, D.P., C.E. McDowell and J-Z. Wang "TraceViewer: A Graphical Browser for Trace Analysis," *Technical Report UCSC-CRL-90-59*
- 1990 Helmbold, D.P., C.E. McDowell and J-Z. Wang "Detecting Data Races by Analyzing Sequential Traces," *Technical Report UCSC-CRL-90-57*
- 1990 Copperman, M., and C.E. McDowell "Detecting Unexpected Data Values in Optimized Code," *Technical Report UCSC-CRL-90-56*
- 1989 "Representing Reachable States of a Parallel Program," *Technical Report UCSC-CRL-89-17*
- 1987 McDowell, C.E. and M.P. Moore "Bi-Directional Networks for Large Parallel Processors," *Computer Architecture News*, June.
- 1987 Appelbe, W.F., A. Finke, and C.E. McDowell "Language Primitives for Parallel Numerical Algorithms," *Technical Report UCSC-CRL-87-05*
- 1985 Appelbe, W.F. and C.E. McDowell "Anomaly Detection in Parallel Fortran Programs," *Proc. Workshop on Parallel Processing using the HEP*. Extended abstract
- 1983 "SIMAC: A Simple Multiple ALU Computer," *Ph.D. Dissertation, University of California, San Diego*, June