Brian A. Malloy

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Interests

Research

Software analysis, comprehension, visualization, testing, and maintenance.
Compiler technology, grammarware, front-end construction and development.
Procedural Generation of Video Game Media

Teaching

Program Analysis, Compiler Technology, Object Technology, 2D and 3D Video Game Development.

Education

University of Pittsburgh, Pittsburgh, PA, 1987–1990
Ph.D. Computer Science, April 1991
Dissertation: *A Fine-Grained Approach to Scheduling Asynchronous Multiprocessors*
Advisor: Mary Lou Soffa

University of Pittsburgh, Pittsburgh, PA, 1981–1983
M.S. in Computer Science, April 1991
Advisor: Errol L. Lloyd

University of Pittsburgh, Pittsburgh, PA, 1973–1975
M.Ed. in Counseling, April 1975

LaSalle University, Philadelphia, PA, 1964–1968
B.A. Mathematics, August 1968

Professional Experience

Clemson University, 1990–present
Associate Professor of Computer Science

University of Ireland at Maynooth (sabbatical), August 1998–July 1999
Visiting Professor of Computer Science

University of Pittsburgh, 1987–1990
Lecturer in Computer Science

Duquesne University, 1983–1987
Assistant Professor of Computer Science in Department of Mathematics

Honors and Awards

ACM Best Teacher of the Year: 2001, 2002

Best Paper Award, June, 1999

Using Jet Routes to Model Path Re-routing in the National Airspace System, Best Paper Award at *The European Simulation Conference* in Warsaw Poland. June 1-4, 1999.

Best Paper Award ($10,000), December, 1996

An Extensible SIMPLE++ Simulator for a PCS Network, first prize winner of $10,000; contest sponsored by the AESOP corporation and the Society for Computer Simulation in December 1996. The co-author of the paper is B. Chen.

Selected Publications

Dr. Malloy and his research advisees are underlined.

Refereed Journal Articles

[JSEKE11] 1. B. A. Malloy, E. L. Lloyd, J. O. Hallstrom, and E. B. Duffy, "Capturing Interface Protocols for Comprehension and Evaluation of C++ Libraries," Accepted in *Journal of Knowledge and Systems Engineering.*

[TSE09] 2. N. A. Kraft, E. B. Duffy, and B. A. Malloy, " Grammar Recovery from Parse Trees and Metrics-Guided Grammar Refactoring," *IEEE Transactions on Software Engineering (Special Issue on Software Language Engineering)*, Scheduled to appear in the May-June issue of 2009.

[SCP09] 3. J. E. Denny and B. A. Malloy, "The IELR(1) algorithm for generating minimal LR(1) parser tables for non-LR(1) grammars with conflict resolution;" *Science of Computer Programming*; Sept 2009.

[SCP07] 4. N. A. Kraft, B. A. Malloy, and J. F. Power, "A Tool Chain for Reverse Engineering C++ Applications," *Science of Computer Programming (Special Issue on Experimental Software and Toolkits)*, 69(1–3): 3–13, December 2007.

[IST07] 5. N. A. Kraft, B. A. Malloy, and J. F. Power, "An Infrastructure to Support Interoperability in Reverse Engineering," *Information and Software Technology*, 49(3): 292–307, March 2007.

[JSS06] 6. N. A. Kraft, E. L. Lloyd, B. A. Malloy, and P. J. Clarke, "The Implementation of an Extensible System for Comparison and Visualization of Class Ordering Methodologies," *Journal of Systems and Software*, 79(8): 1092–1109, August 2006.

[SOFTWARE06] 7. B. A. Malloy, N. A. Kraft, J. O. Hallstrom, and J. M. Voas, "Improving the Predictable Assembly of Service-Oriented Architectures," *IEEE Software*, 23(2): 12–15, April 2006.

[JSEKE06] 8. P. J. Clarke, J. Ding, D. Babich and B. A. Malloy "A Tool to Automatically Map Implementation-Based Testing Techniques to Classes," *International Journal of Software Engineering and Knowledge Engineering*, 16(4): 585–614, 2006.

[STVR06] 9. B. A. Malloy and J. F. Power, "Exploiting design patterns to automate validation of class invariants," *Journal of Software Testing, Verification and Reliability*, 16(2): 71–95, June 2006.

[JOT05a] 10. E. L. Lloyd and B. A. Malloy, "A Study of Test Coverage Adequacy In the Presence of Stubs," *Journal of Object Technology*, July/August, 2005.

[JOT05b] 11. P. J. Clarke and B. A. Malloy, "A Taxonomy of OO Classes to Support the Mapping of Testing Techniques to a Class," *Journal of Object Technology*, July/August, 2005.

[JSME04] 12. J. F. Power and B. A. Malloy, "A Metrics Suite for grammar-based software," *Journal of Software Maintenance and Evolution*, 16(6): 405–426, November 2004.

[ITPRO04] 13. B. A. Malloy and J. Voas, "Programming with Assertions: A Prospectus," *IEEE IT Professional*, pp. 54–59, November/December 2004.

[SPE03] 14. B. A. Malloy, T. H. Gibbs and J. F. Power, "Decorating tokens to facilitate recognition of ambiguous language constructs," *Software, Practice and Experience*, 33(1): 19–39. January 2003.

[JCIS02] 15. B. A. Malloy, "A Comparison of Path Profiling and Edge Profiling in C++ Applications," *International Journal of Computers and Information Systems*, 3(3): 205–216, September 2002.

[IJCIS02] 16. P. J. Clarke and B. A. Malloy, "Identifying Implementation-Based Testing Techniques for Classes," *International Journal of Computers and Information Systems*, 3(3): 195–204, September 2002.

[IJCA01] 17. B. A. Malloy, J. D. McGregor and S. Hughes "Exploiting IOstreams to Incorporate a GUI into a Command-Driven Application," *International Journal of Computers and Applications*, 23(3): 152–159, 2001.

[ESE99] 18. J. McGregor, C. Il-Hyung, B. A. Malloy, E.L. Curry, and C. Hobatr "Collecting Metrics for CORBA-Based Distributed Systems," *Empirical Software Engineering*, Volume 4: 217–240, 1999.

[IJSMRE99] 19. B. A. Malloy and G. Levasseur, "Exploiting object technology in computer simulation," *International Journal of Surface Mining, Reclamation and Environment*, Volume 13: pp. 73–76, 1999.

[JS98] 20. B. A. Malloy and B. Chen, "Exploiting an Object-Oriented Simulation Tool to Model a PCS Network," *Journal of Simulation*, 70(6): 369-378, June 1998.

[JIS97] 21. D. A. Gupta, B. A. Malloy and A. McRae, "The Complexity of Scheduling for Data Cache Optimization," *International Journal of Information Sciences*, 100(1-4): 27–48, August 1997.

[SE96] 22. J. D. McGregor, B. A. Malloy and R. L. Siegmund, "A Comprehensive Program Representation for Object-Oriented Software," *Annals of Software Engineering*, Baltzer Science Publishers, Volume 2: 51–91, 1996.

[TPDS94] 23. B. A. Malloy, E.L. Lloyd and M.L. Soffa, "Scheduling Dags for Asynchronous Multiprocessor Execution," *IEEE Transactions on Parallel and Distributed Systems*, 5(5): 498–508, May 1994.

[TSE93] 24. M.J. Harrold and B. A. Malloy, "A Unified Interprocedural Program Representation for a Maintenance Environment," *IEEE Transactions on Software Engineering*, 19(16): 584–593, June 1993.

[SPE90] 25. B. A. Malloy and M.L. Soffa, "Conversion of Simulation Processes to Pascal Constructs," *Software, Practice and Experience*, 20(2): 191–207, February 1990,

Articles in Dr. Dobbs Journal

[DDJ03] 1. B. A. Malloy, T. H. Gibbs and J. F. Power, "Progression Toward Conformance for C++ Language Compilers," *Dr. Dobbs Journal*, pp. 54–60, November 2003.

[DDJ02] 2. B. A. Malloy, S. A. Linde, E. B. Duffy and J. F. Power, "Testing C++ Compilers for ISO Language Conformance," *Dr. Dobbs Journal*, pp. 71–80, June 2002.

Book Chapter

[MultArch03] 1. B. A. Malloy. "Modeling Multiprocessor Architectures," Chapter 2 in *The State of the art in Performance Modeling and Simulation*, pp. 19–34. Gordon and Breach Publishers. G. Zobrist, J. Walrand and K Bagchi, editors. 2005.

Refereed Conference and Workshop Proceedings

[ACMSE12] 1. E. B. Duffy and B. A. Malloy, "Design and Implementation of a Language-Complete C++ Semantic Graph," *Proceedings of the* 50^{th} *Annual Association for Computing Machinery Southeast Conference, 2012*, Tuscaloosa AL, USA, March 29-31, 2012.

[CGAMES11] 2. E. A. Matthews and B. A. Malloy, "Procedural Generation of Story-Driven Maps," *Computer Games: AI, Animation, Multimedia, Education and Serious Games, 2011*, Louisville, USA, July 27-30, 2011.

[FP10] 3. D. H. House, B. A. Malloy, and C. Buckley. "The Craft of Computer Programming: Lifting the Veil," *FuturePlay 2010*, Vancouver, BC, May 6-7, 2010.

[ASE09] 4. B. C. Dean, W. B. Pressly, B. A. Malloy, and A. A. Whitley. "A Linear Programming Approach for Automated Localization of Multiple Faults," *International Conference on Automated Software Engineering*, (Submitted).

[CSIIRW09] 5. B. A. Malloy, M. Sitaraman, and J. O. Hallstrom. "Detecting Overflow Vulnerabilities Using Automated Verification," *Cyber security and information intelligence challenges and strategies*, Knoxville, Tennessee, April 13-15, 2009.

[SEKE08] 6. E. B. Duffy, J. O. Hallstrom and B. A. Malloy. "Reverse Engineering Interface Protocols for Comprehension of Large C++ Libraries during Code Evolution Tasks," *Proceedings of The 20th International Conference on Software Engineering and Knowledge Engineering, SEKE'2008*, Redwood, California, July 1-3, 2008.

[SAC08] 7. Denny, J. E. and B. A. Malloy. "IELR(1): Practical LR(1) Parser Tables for Non-LR(1) Grammars with Conflict Resolution," *Proceedings of the ACM Symposium on Applied Computing*, Programming Languages Track, pp. 240–245. Fortaleza, Ceara, Brazil, March 16-20, 2008. (Acceptance: 29.3%)

[WCRE07] 8. E. B. Duffy and B. A. Malloy. "An Automated Approach to Grammar Recovery for a Dialect of the C++ Language," *Proceedings of the* 14^{th} *Working Conference on Reverse Engineering*, pp. 11-20. Vancouver, BC, Canada, October 2007. (Acceptance: 27/87, 31%)

[SEKE06] 9. Hoipkemier, B. N., N. A. Kraft, and B. A. Malloy, "3D Visualization of Class Template Diagrams for Deployed Open Source Applications," *Proceedings of the* 18^{th} *International Conference on Software Engineering and Knowledge Engineering*, pp. 232–235. San Francisco, CA, USA, July 5–7, 2006.

[WCRE05] 10. N. A. Kraft, B. A. Malloy, and J. F. Power, "Toward an Infrastructure to Support Interoperability in Reverse Engineering," *Proceedings of the* 12^{th} *Working Conference on Reverse Engineering*, pp. 196–205. Pittsburgh, PA, USA, November 7–11, 2005.

[FP05] 11. Jamieson, A. C., N. A. Kraft, J. O. Hallstrom, and B. A. Malloy, "A Metric Evaluation of Game Application Software," *Proceedings of Future Play 2005: The International Academic Conference on the Future of Game Design and Technology*, East Lansing, MI, USA, October 13–15, 2005.

[TTSE05] 12. N. A. Kraft, B. A. Malloy, and J. F. Power, "g^{4}re: Harnessing GCC to Reverse Engineer C++ Applications," *Transformation Techniques in Software Engineering: Dagstuhl Seminar Proceedings 05161*, Dagstuhl, Germany, April 17–22, 2005.

[VL/HCC05] 13. B. A. Malloy and J. F. Power. "Using a Molecular Metaphor to Facilitate Comprehension of 3D Object Diagrams," *Proceedings of IEEE Symposium on Visual Languages and Human-Centric Computing*, pp. 21–24. Dallas, Texas, USA, September 2005.

[SERA05] 14. E. B. Duffy and B. A. Malloy. "A Language and Platform-Independent Approach for Reverse Engineering," *Proceedings of The 3rd ACIS International Conference on Software Engineering Research, Management & Applications*, pp. 415–422. Lansing, MI, August 11–13, 2005.

[SoftViz05] 15. B. A. Malloy and J. F. Power. "Exploiting UML dynamic object modeling for the visualization of C++ programs," *Proceedings of ACM Symposium on Software Visualization*. Saint Louis, Missouri, USA, May 14–15, 2005.

[SEA04] 16. P. J. Clarke and B. A. Malloy. "Using a Taxonomy to Analyze Classes During Implementation-Based Testing," *Proceeding of the 8th International Conference on Software Engineering and Applications*, pp. 288–293. MIT Cambridge MA, USA, Nov 9–11, 2004.

[ISSRE03] 17. B. A. Malloy, P. J. Clarke and E. L. Lloyd. "A Parameterized Cost Model to Order Classes for Class-based Testing of C++ Applications," *Proceedings of International Symposium on Software Reliability Engineering*, pp. 353–364. Denver Colorado, USA, Nov 17–20, 2003.

[SEA03] 18. N. Kassel and B. A. Malloy. *An Automated Approach Toward Requirements Elicitation*, *Proceedings of International Conference on Software Engineering and Applications*, pp. 544-549. Marina DelRey, CA, USA, Nov 3–5, 2003.

[IWPC03a] 19. E. B. Duffy, J. P. Gibson and B. A. Malloy. "Applying the Decorator Pattern for Profiling Object-Oriented Software," *Proceedings of International Workshop on Program Comprehension*, pp. 84–93. Portland Oregon, May 10–11, 2003,

[IWPC03b] 20. M. Hennessy, B. A. Malloy, and J. F. Power. "gccXfront: Exploiting gcc as a Front End for Program Comprehension Tools via XML/XSL," *Proceedings of International Workshop on Program Comprehension*, pp. 298–299. Portland Oregon, May 10–11, 2003,

[CSMR03a] 21. T. H. Gibbs and B. A. Malloy. "Weaving Aspects into C++ Applications for Validation of Temporal Invariants," *Proceedings of 7th European Conference on Software Maintenance and Reengineering*, pp. 249–258. Benevento Italy, March 2003.

[CSMR03b] 22. P. J. Clarke and B. A. Malloy, P. Gibson. "Using A Taxonomy Tool To Identify Changes in OO Software," *Proceedings of 7th European Conference on Software Maintenance and Reengineering*, pp. 213–222. Benevento Italy, March 2003.

[ICIS02] 23. P. J. Clarke and B. A. Malloy. "Taxonomy of Classes to Identify Changes During Maintenance," *Proceedings of the International Conference on Computer and Information Systems*, pp. 631–636. August 8–9, 2002, Seoul, Korea.

[WCRE02] 24. J. F. Power and B. A. Malloy. "Program annotation in XML: a parser-based approach," *Proceedings of Working Conference on Reverse Engineering*, pp. 190–198. October 28 - November 1, 2002, Richmond, Virginia, USA.

[ASE02] 25. T. H. Gibbs, B. A. Malloy and J. F. Power. "Automated Validation of Class Invariants In C++ Applications," *Proceedings of the* 17^{th} *IEEE International Conference on Automated Software Engineering*, pp. 205–214. September 23-27, 2002, Edinburgh, UK.

[SAICSIT02] 26. B. A. Malloy, J. F. Power and J. T. Waldron. "Applying Software Engineering Techniques to Parser Design: the development of a $C^{\#}$ parser," *Proceedings of Annual Conference of the South African Institute of Computer Scientists and Information Technologists*, pp. 75–82. September 16–18, 2002, Port Elizabeth, South Africa.

[ICCS02] 27. J. B. von Oehsen, C. L. Cox, E. Cyr and B. A. Malloy. "Using Design Patterns and XML to Construct an Extensible Finite Element System," *Proceedings of The 2002 International Conference on Computational Science*, pp. 735 - 744. Amsterdam, The Netherlands, April 21-24, 2002,

[TOOLS02] 28. S. Matzko, P. J. Clarke, thgibbs, B. A. Malloy. "Reveal: A Tool to Reverse Engineer Class Diagrams," *Proceedings of the International Conference on the Technology of Object-Oriented Languages and Systems*, pp. 13 - 21. Sydney, Australia, February 18-21, 2002,

[ICIS01a] 29. B. A. Malloy and J. F. Power. "An Interpretation of Purdom's Algorithm for Automatic Generation of Test Cases," *Proceedings of the International Conference on Computer and Information Systems*, pp. 310–317. October 3–5, 2001, Orlando, USA.

[ICIS01b] 30. P. J. Clarke and B. A. Malloy. "A Unified Approach to Implementation-Based Testing of Classes," *Proceedings of the International Conference on Computer and Information Systems*, pp. 226–234. October 3–5, 2001, Orlando, USA.

[ICIS01c] 31. V. Rajagopalan and B. A. Malloy. "A Study of Phased Branch Behavior in C++ Applications," *Proceedings of the International Conference on Computer and Information Systems*, pp. 7–14. October 3–5, 2001, Orlando, USA.

[ICIS01d] 32. J. B. von Oehsen, R. C. Jenkins, C. L. Cox and B. A. Malloy. "Exploiting XML to Provide a Uniform Interface for Graphical Representation of Finite Element Analysis," *Proceedings of the International Conference on Computer and Information Systems*, pp. 181–185. October 3–5, 2001, Orlando, USA.

[FIE2001] 33. D. P. Jacobs and B. A. Malloy. "An Application-Centered Course on Data-Driven Web Sites," *Proceedings of Frontiers in Education 2001*, pp. F2D-10 to F2D-14. Reno NV, October 10-13, 2001.

[ICSE01] 34. Hobatr, C. and B. A. Malloy. "Using OCL-Queries for Debugging C++," *Proceedings of the International Symposium on Software Engineering*, pp. 839–840. Formal Research Demo on Verification and Maintenance, Toronto, Canada, May 12-19, 2001.

[SAC01a] 35. J. F. Power and B. A. Malloy. "Exploiting Metrics to Facilitate Grammar Transformation into LALR Format," *Proceedings of the ACM Symposium on Applied Computing*, Programming Languages Track, pp. 636–640. Las Vegas, USA, March 11-14, 2001.

[SAC01b] 36. Hobatr, C. and B. A. Malloy. "The Design of an OCL Query-Based Debugger for C++," *Proceedings of the ACM Symposium on Applied Computing*, Software Engineering Track, pp. 658–662. Las Vegas, USA, March 11-14, 2001.

[IIPS01] 37. S. Kirby, Y.Yee, P. Haines, T.Henmi, and B. A. Malloy. "Exploiting the internet to automate the execution of mesoscale models," *Proceedings of 17th International Conference on Interactive Information and Processing Systems (IIPS)* for Meteorology, Oceanography, and Hydrology, American Meteorology Society, pp. 413-417. Albuquerque, NM, January 14–18, 2001.

[TOOLS2000] 38. J. F. Power and B. A. Malloy. "Symbol table construction and name lookup in ISO C++," *Proceedings of the International Conference on the Technology of Object-Oriented Languages and Systems*, pp. 57-68. Sydney, Australia, November 20-23, 2000.

[ICSM2000] 39. J. P. Gibson, T. F. Dowling and B. A. Malloy. "The Application of Correctness Preserving Transformations to Software Maintenance," *Proceedings of the International Conference on Software Maintenance*, pp. 108-119. San Jose, CA, October 11–14, 2000.

[IWPC2000] 40. J. F. Power and B. A. Malloy. "Metric-Based Analysis of Context-Free Grammars," *Proceedings of the International Workshop on Program Comprehension (co-located with ICSE'2000)*, pp. 171-178. Limerick Ireland, June 10–11, 2000.

[SAC2000] 41. J. F. Power and B. A. Malloy. "An Approach for Modeling the Name Lookup Problem in the C++ Programming Language," *Proceedings of the ACM Symposium on Applied Computing*, pp. 792–796. Villa Olmo, Como, Italy, March 19-21, 2000.

[ICCSI2000] 42. T. Dowling and B. A. Malloy. "The Design of A Component-Based Encryption Scheme," *Proceedings of the Fifth International Conference on Computer Science and Informatics*. Atlantic City, NJ, February 27–March 3, 2000.

[ICCSI2000] 43. B. A. Malloy, J. D. McGregor and S. Elliot. "Using the Sage++ Tool to Model Control Flow and Extend Cyclomatic Complexity," *Proceedings of the Fifth International Conference on Computer Science and Informatics*. Atlantic City, NJ, February 27–March 3, 2000.

[ICSEA99] 44. B. A. Malloy, J. D. McGregor and S. Hughes. "Integrating a GUI into a Command Driven Application," *Proceedings of the International Conference on Software Engineering and Applications*, pp. 179–183. Scottsdale, Arizona, October 6-8, 1999.

[ESM99] 45. B. A. Malloy, D. E. Bushey and S. Yang. "Using Jet Routes to Model Path Re-routing in the National Airspace System," *Proceedings of the 13th European Simulation Multiconference*. pp. 543–550. Warsaw Poland, June 1-4, 1999.

[ESM99] 46. B. A. Malloy, M. L. Haungs and Mark Smotherman. "The Construction of a Family of Simulators for the Intel Architecture with ELF Binary Input," *Proceedings of the 13th European Simulation Multiconference*, pp. 77–84. Warsaw Poland, June 1-4, 1999.

[ISMS98] 47. J. McGregor, Il-Hyung Cho, B. B. A. Malloy, E.L. Curry, and C. Hobatr. "Collecting Metrics for CORBA-Based Distributed Systems," *Proceedings of the Fifth International Software Metrics Symposium*, pp. 11–22, 1998.

[OOS98] 48. B. A. Malloy and S. Chitre. "Extending SIMx86 to Include Prefetching, Segmentation, Virtual Memory Addressing and Protection Mode," *Proceedings of the 1998 Conference on Object-Oriented Simulation*, pp. 39–44. San Diego CA, January 11–14, 1998.

[SS97] 49. A. R. Shealy, B. A. Malloy and D. A. Sykes. "SIMx86: An Extensible Simulator for the Intel 80x86 Processor Family," *Proceedings of the 30th Annual Simulation Symposium*, pp. 157–166. Atlanta GA, April 7–9, 1997.

[ASS97] 50. D. E. Bushey and B. A. Malloy. "A Study of Dynamic Traffic Re-Routing in the National Airspace System," *Proceedings of the 30th Annual Simulation Symposium*, pp. 104–113. Atlanta GA, April 7–9, 1997.

[OOS97] 51. B. Chen, B. A. Malloy and J. C. Pec., "An Extensible SIMPLE++ Simulator for PCS Network Simulation," *Proceedings of the 1997 Conference on Object-Oriented Simulation*, pp. 87–92. Phoenix AZ, January 12–15, 1997.

[WSC96] 52. D. A. Sykes and B. A. Malloy. "The Design of an Efficient Simulator for the Pentium Pro Processor," *Proceedings of 1996 Winter Simulation Conference*, pp. 840–847. Coronado CA, December 8–11, 1996.

[OOPSLA/ES] 53. B. A. Malloy, J. D. McGregor, and D. A. Gupta. "An Approach to Blending Analysis, Design and Implementation," *Proceedings of the OOPSLA'96 Educators' Symposium*, San Jose CA, October 1996.

[OOS96] 54. Douglass, J. T., D. A. Gupta, B. A. Malloy and D. A. Sykes. "An Efficient, Extensible Design of a PCS Network Simulation," *Proceedings of Object-Oriented Simulation Conference*, pp. 109–114. La Jolla SD, January 14-17, 1996.

[WSC95a] 55. B. A. Malloy and Montroy, A. T.. "A Parallel Distributed Simulation of a Large-Scale PCS Network: Keeping Secrets," *Proceedings of 1995 Winter Simulation Conference*, pp. 571–578. Washington DC, December 3-6, 1995.

[WSC95b] 56. Galluscio, A. P., J. T. Douglass, B. A. Malloy and A. Joe Turner. "A Comparison of Two Methods for Advancing Time In Parallel Discrete Event Simulation," *Proceedings of 1995 Winter Simulation Conference*, pp. 650–657. Washington DC, December 3-6, 1995.

[OOPSLA/ES] 57. B. A. Malloy, dagupta, A. Kare, J. D. McGregor. "Incorporating Reusability and Extensibility into the CS 2 Curriculum," *Proceedings of the OOPSLA'95 Educators' Symposium*. October 1995, Austin TX.

[WSC94] 58. J. T. Douglass and B. A. Malloy. "Using a Shot Clock to Design an Efficient Parallel Distributed Simulation," *Proceedings of 1994 Winter Simulation Conference*. December 11-14, 1994, Orlando FL, pp. 1362–1369.

[MASCOTS94] 59. B. A. Malloy. "Trace-Driven and Program-Driven Simulation: A Comparison," *Proceedings of International Workshop on Modeling and Simulation of Computer and Telecommunication Systems*, pp. 395–396. Durham NC, January 31 - February 2, 1994.

[MICRO-26] 60. M. Smotherman, S. Chawla, S. Cox and B. A. Malloy. "Instruction Scheduling for the Motorola 88110," *Proceedings of MICRO-26, The 26th Annual International Symposium on Microarchitecture*, pp. 257–262. Austin TX, December 1-3, 1993.

[WSC93] 61. B. A. Malloy. "The Validation of a Multiprocessor Simulator," *Proceedings of 1993 Winter Simulation Conference*, pp. 625–631. Los Angeles CA, December 12-15, 1993.

[SM/OOS-93] 62. B. A. Malloy, M. J. Harrold, J. D. McGregor. "The Implementation of a Simulation Language Using Dynamic Binding," *Proceedings of 1993 Simulation Multiconference - Object Oriented Simulation*, pp. 3–8. La Jolla CA, January 1993.

[ISSTA-93] 63. M.J. Harrold, B.A. B. A. Malloy and G. Rothermel. "Efficient construction of program dependence graphs," *Proceedings of the ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA) 93*, pp. 139–148. Cambridge MA, June 1993.

[MICRO-25] 64. B. A. Malloy, R. Gupta and M.L. Soffa. "A Shape Matching Approach for Scheduling Fine-Grained Parallelism," *Proceedings of MICRO-25, The 25th Annual International Symposium on Microarchitecture*, pp. 131–135. Portland OR, December 1992.

[ICCI-92] 65. B. A. Malloy, E.L. Lloyd and M.L. Soffa. "A Fine Grained Approach to Scheduling Asynchronous Multiprocessors," *Proceedings of 4th International Conference on Computing and Information*, pp. 139–142. Toronto Canada, May 1992.

[ICSM-92] 66. M.J. Harrold and B. A. Malloy. "Data Flow Testing of Parallelized Code," *Proceedings of Conference on Software Maintenance*, pp. 272–281. Orlando FL, November 1992.

[ICSM-91] 67. M.J. Harrold and B. A. Malloy. "A Unified Program Representation for a Maintenance Environment," *Proceedings of Conference on Software Maintenance*, pp. 138–147. Sorrento Italy, September 1991.

[WSC-86] 68. B. A. Malloy and M.L. Soffa. "Simcal: The Merger of Simula and Pascal," *Proceedings of Winter Simulation Conference*, pp. 397–403. Washington DC, December 1986.

Other Conference and Workshop Presentations

[WCRE05] 1. N. A. Kraft, B. A. Malloy, and J. F. Power, "g^{4}re - A Tool Chain for Reverse-engineering C++," *Tool Demonstration at the 12th Working Conference on Reverse Engineering (WCRE 2005)*, Pittsburgh, PA, USA, November 7–11, 2005.

[Dagstuhl05] 2. N. A. Kraft, B. A. Malloy, and J. F. Power, "Harnessing GCC to Reverse engineer C++ Applications," *Dagstuhl Seminar 05161, 17.04.-22.04.2005*, Transformation Techniques in Software Engineering, J. R. Cordy, R. Lammel, A. Winter (Eds.). Dagstuhl Castle, Germany, April 17, 2005.

Grants and Contracts

Video Game Development on the DS; An Undergraduate Creative Inquiry Course, Sponsored by Clemson University, from 8/1/2008 to 5/1/2009. $5,000.

Sensor-Enabled Game Design Using C# and XNA; An Undergraduate Creative Inquiry Course, Sponsored by Clemson University, from 8/1/2007 to 5/1/2008. $5,000.

Extending Game Engine Design and Construction Into An Undergraduate Research Effort, Sponsored by Clemson University, from 8/1/2006 to 5/1/2007. $5,000.

Center for Advanced Engineering Fibers and Films, Sponsored by NSF (National Science Foundation) from 8/1/2001 to 8/31/2003. $34,000 per year.

An Object-Oriented Design for a Meteorological Measurements Toolkit, $24,363 from *Battelle, Research Triangle Park*, with Young Yee, Army Research Laboratory, contract TCN 01-081. April 2002 – August 2002.

An Object-Oriented Design for a Meteorological Measurements Toolkit, $17,267 from *Battelle, Research Triangle Park*, with Young Yee, Army Research Laboratory, contract TCN 01-080. April 2001 – August 2001.

The Application of Formal Methods to Compiler Technology, £6,000 from *Enterprise Ireland International Collaboration Programme*, Grant # IC/2001/061, With J. Power, P. Gibson and R. Monahan of NUI Maynooth, Ireland. April 2001 – April 2002.

Object-Oriented Tools for Data Collection and Analysis of Meteorological Measurements, $24,287 from *Battelle, Research Triangle Park*, with Young Yee, Army Research Laboratory, contract DAAH04-96-C-0086. April 2000 – August 2000.

Center for Advanced Engineering Fibers and Films, National Science Foundation, Clemson University, Clemson, SC (summer funding since 2001).

Using the Unified Modeling Language to Construct a Parser for C++, £3,000 from *Enterprise Ireland International Collaboration Programme*, with J. Power of NUI Maynooth, Ireland. April 1999 – April 2000.

Performance Metrics for Distributed Systems, $64,000 grant from TACOM, with J. D. McGregor, 1997–1998.

IQtest: A Testbed Management Tool, $24,000 contract from Biotech Corp, with J. D. McGregor, 1997–98.

A Workshop on the World Wide Access of Emerging Mathematical Technology, $16,640 grant from NSF, with D. Jacobs, 1995.

Integrating Object-Oriented Concepts into the Undergraduate Curriculum Using Ada, $64,000 grant from Darpa, with J. D. McGregor, 1995.

Student Supervision

Doctoral Dissertations

Edward B. Duffy: *Validation of Applications using Static and Dynamic Analysis* (in progress), expected graduation: December, 2010.

Joel E. Denny: PSLR(1): Pseudo-Scannerless Minimal LR(1) for the Deterministic Parsing of Composite Languages, April, 2010.

Nicholas Kraft: *An Infrastructure to Support Interoperability In Reverse Engineering*, February, 2007.

Neil W. Kassel: *An Approach to Automate Test Case Generation from Structured Use Cases*, May, 2006

Peter Clarke: *A Taxonomy of Classes to Support Integration Testing and the Mapping of Implementation-based Testing Techniques to Classes*, August, 2003.

Tanton H. Gibbs: *The Design and Implementation of a Parser and Front-end for the ISO C++ Language and Validation of the Parser*, May, 2003.

Master's Theses

Robert Morefield, *Harnessing OSG and SDL as a Cross-Platform 3D Game Development Toolset*, November 2007.

Robert R Bailey III (Tres'), *A Comparison of Class Diagram Construction at Three Different Phases of Compilation*, August, 2007.

Benjamin N. Hoipkemier, *3D Visualization of Class Template Diagrams for Deployed Open Source Applications*, May, 2006.

David N. Graham, *Exploiting GCC'S GENERIC for Visualizing, Constructing, and Validating Data Structures and Call Sites*, April, 2005.

Surja Bandarkar, *Call Graph Construction Using an Abstract Semantic Graph*, December, 2004.

Mukesh J. Dhannawat, *Automated Generation of a Test Framework for Agile Development*, September, 2003.

Joel E. Denny, *BOF: A C++ Framework for Generating Cooperating Scanner and Parser Classes Using Flex and Bison*, July, 2003.

Benjamin E. Deaton, *SCIEnCE Web: Teaching with Technology*, April, 2002.

Sarah Matzko, *Reveal, A Tool to Reverse Engineer Class Diagrams*, November, 2001.

Timothy S. Whisonant, *The Design and Implementation of a Hierarchical Container Library*, November, 2000.

Brian D. Weldon, *A Predictive LL(k) Parser Front-End for C++*, November, 2000.

Loren Larsen, *IRISIC: A Model of Distributed Introspection*, December, 1994.

Master's Projects

Ryan Schutt, *A Technique for Extending Java Using JavaCC and Java*, November, 2002.

Matthew Cantrell, *An Effective Implementation of Multicasting Based on TFTP*, November, 2002.

Scott Linde, *A Test Suite and Test Harness for ISO C++ Conformance*, November, 2001.

Vinay Rajagopalan, *A Study of Phased Branch Behavior in C++ Applications*, June, 2001.

Vaishali Chitre, *A Solution to Argument-Dependent Name Lookup for a C++ Symbol Table*, May, 2000.

Vishal Jadhav, *Security Issues in Web-based Information Retrieval*, August, 1998.

Bhupesh Umatt, *Incorporating Paging into Simx86*, August, 1998.

Amitabh Bhonsle, *A Technique to Automate IDL Construction*, July, 1998.

Muralidhar R. Kallem, *Exception Handling in Distributed Systems*, July, 1998.

Shaowu Yang, *Using Jet Routes to Model Path Re-routing in the National Airspace System*, July, 1998.

Shannon A. Hughes, *Incorporating a Graphical User Interface into Legacy Code*, March, 1998.

Michael Haungs, *Extending SIMx86 to the 386 Architecture with ELF Binary Input*, April, 1998.

Liangren Li, *A Platform Independent Grader Program using the Java Development Kit (JDK)*, July, 1997.

Rochna S. Dhand, *A PCS Simulation Using Distributed Objects in a CORBA Environment*, July, 1997.

Sudarshan Chitre, *Extending SIMx86 to include Prefetching, Segmentation, Virtual Memory Addressing and Protection Mode* , June, 1997.

Bin Chen, *The Design and Implementation of a PCS Network Simulation using SIMPLE++*, November, 1996.

Alan Shealy, *SIMx86: An Extensible Simulator for the Intel 80x86 Processor Family*, November, 1996.

Dean Bushey, *A Study of Dynamic Traffic Re-Routing in the National Airspace System*, October, 1996.

Randall Fields, *A Distributed PCS Simulation Exploits an Object-Oriented Design*, June, 1996.

Sandeep Nandkeolyar, *Using the Sage++ Toolkit to Build a Tool for Program Understanding*, April, 1996.

Sheryl Elliot, *Using the Sage + + Tool to Model Control Flow and Extend Cyclomatic Complexity*, April, 1996.

Albert Montroy, *A Parallel Distributed Simulation of A Large-Scale PCS Network: Keeping Secrets*, April, 1995.

Anthony P. Galluscio, *Event-Driven and Time-Driven Parallel Simulation: A Comparison*, March, 1995.

James A. Drenter, *The Implementation of a Process-Driven Simulation Library*, December, 1994.

Devidas Gupta, *Scheduling Techniques for Improving Data Cache Performance*, May, 1994.

John T. Douglass, *Using a Shotclock to Design an Efficient Parallel Distributed Simulation*, April, 1994.

Narassah Govindaraja, *Efficient Construction of Program Dependence Graphs*, April, 1993.

Professional Activities

Journal Editor

International Journal of Patterns, IJOP

Program Committee Member

International Conference on Software Language Engineering, program co-chair; (SLE 2010), October 12–13, 2010, Eindhoven, Netherlands.

International Conference on Software Reuse; Expert Panel Member for Doctoral Symposium, (ICSR 2009), September, 2009, Washington, DC.

International Conference on Software Language Engineering, (SLE 2009), September, 2009, Denver, Colorado.

Seventh Workshop on Language Descriptions, Tools and Applications, (LDTA'07), March, 2007, Braga, Portugal.

Sixth Workshop on Language Descriptions, Tools and Applications, (LDTA'06), April, 2006, Vienna, Austria.

International Conference on the Principles and Practice of Programming in Java, (PPPJ'06), August, 2006, Mannheim, Germany.

3rd International Conference on the Principles and Practice of Programming in Java, (PPPJ'04), June, 2004, Dublin, Ireland.

12th International Workshop on Program Comprehension, (IWPC'04), June, 2004, University of Bari, Dipartimento di Informatica, Bari, Italy.

The Fifteenth International Symposium on Software Reliability Engineering, (ISSRE'04), November, 2004; Palais du Grand Large at Saint-Malo in Brittany, France.

2nd International Conference on the Principles and Practice of Programming in Java, Kilkenny City, Ireland, June, 2003.

International Workshop on Source Code Analysis and Manipulation, (SCAM'01), November, 2001, Florence, Italy, Co-located with IEEE International Conference on Software Maintenance, (ICSM2001).

1st International Conference on Software Engineering, Networking, and Parallel and Distributed Computing, (SNPD'00), May, 2000; University of Rheims, Champagne-Ardenne, France.

Reviewer

ACM Transactions on Programming Languages and Systems (TOPLAS).

IEEE Transactions on Software Engineering and Methodology (TSE).

IEEE Software.

Journal of Software Quality.

International Journal of Software Maintenance and Engineering

ACM Transactions on Software Engineering Methodology (TOSEM).

Journal of Software Maintenance and Evolution (JSME).

Software – Practice and Experience (SP&E).

International Conference on Software Engineering Research, Management, and Applications (SERA)

Member

Association for Computing Machinery (ACM), 1987–present

ACM Special Interest Group on Software Engineering, 1994–present

ACM Special Interest Group on Programming Languages, 1994–present

Teaching

Graduate Courses

Program Analysis: This graduate course on program analysis places special emphasis on graph structures as program representations, including the control flow graph (CFG), class control flow graph (CCFG), unified interprocedural graph (UIG), program dependence graph (PDG), call graph, object relation diagram (ORD), and directed acyclic graph (dag). The course includes the use of tools to facilitate program analysis including a compiler front-end constructed with flex, bison and treecc.

Compiler Construction: We study all phases of compiler construction including: scanner, parser, semantic analysis and code generation. I have taught this course at both the graduate and undergraduate level.

Software Engineering: This course offers an exploration of all phases of the software life cycle. We use the Unified Modeling Language, UML, and corresponding tools, such as Visio and Together, to express the UML specification. Our investigation of design includes a study of design patterns and their implementation in many of the popular object-oriented languages such as C++, Java and Python. I have taught software engineeering at the undergraduate and graduate level, including a graduate level course on Software Testing Methodologies.

OO Design and Implementation using object technology: The focus of this course is software design and implementation using both object-oriented and generic language structures. Our current version of the course uses C++ as the language vehicle; however, the course might also be taught using another OO language such as Java or Python. The students construct class diagrams, object models and object interaction diagrams and translate the models into an OO application. A central them of the course is an investigation and application of Design Patterns to facilitate robust, easy-to-maintain applications. The course features a problem-based approach where the students participate in the design and implementation of a project in several stages. I have taught this course in America and Ireland.

2D Game Engine Construction: We study 2D Game Engine Construction using the *Simple Directmedia Layer*, SDL. Techniques include drawing a surface, blitting a sprite onto a surface, particle explosions, sound and music, incorporation of AI into game play, and networking game play. The course encourages students to exploit object technology in the design and implementation of a 2D game. The course is offered to upper level undergraduates and graduate students.

3D Game Engine Construction: I have used the DirectX API, Open Scene Graph (OSG) and XNA to build a 3D game. The course is offered to upper level undergraduate and graduate students.

Video Game Development on the DS: We use devkitARM, PAlib and other libraries to develop educational video games for the Dual Screen (DS) platform. The course is offered to upper level undergraduate and graduate students.

Undergraduate Courses

Programming Courses: I have taught *core* computer science courses (CS1, CS2, and CS4) using the languages: Java, C^{++}, C, Ada 95, Ada 83, Modula-2, Pascal and Fortran.

References

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2. Errol L. Lloyd, Full Professor
   Computer and Information Sciences
   University of Delaware
   Newark, DE
   Voice: (302) 831-1958
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3. Jason O. Hallstrom, Assistant Professor
   School of Computing
   301 McAdams Hall
   Clemson University
   Clemson, SC 29634
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