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**Dr. Gregory M. Kapfhammer**  
**Assistant Professor of Computer Science**  
August 2008

## Education

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- April 2007 : University of Pittsburgh, Pittsburgh, Pennsylvania  
Ph.D. in Computer Science, Adviser: Dr. Mary Lou Soffa  
Dissertation Title: *A Comprehensive Framework for Testing Database-Centric Software Applications*
- December 2004 : University of Pittsburgh, Pittsburgh, Pennsylvania  
M.S. in Computer Science, Adviser: Dr. Mary Lou Soffa  
Project Title: *A Family of Test Adequacy Criteria for Database-Centric Applications*
- May 1999 : Allegheny College, Meadville, Pennsylvania  
B.S. in Computer Science, Adviser: Dr. Robert D. Cupper  
Thesis Title: *A Complex Object Data Generator Specification Language to Facilitate Automated Data Creation in Software Component Test Drivers*

Details about my education are available at:  
<http://www.cs.allegheny.edu/~gkapfham/education/>

## Professional Experience

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June 2000 - Present : **Assistant Professor (2007-Present)** and **Instructor (2000-2007)**  
Department of Computer Science, Allegheny College

Developed the department's Applied Computer Science major that teaches students how to use both theory and practical techniques to implement software applications. Enhanced and taught courses in the areas of introductory computer science, data structures, analysis of algorithms, and databases (Computer Science 111, 112, 380). Developed new courses in software engineering, software testing, distributed systems, and computer science internships (Computer Science 290, 441, 550/551). Prepared undergraduates to conduct senior thesis research by teaching Junior Seminar modules (Computer Science 580). Supported undergraduate thesis research by teaching the Senior Seminars (Computer Science 600 and 601) and organizing the Research in Computer Science Seminar (RICSS). Served as both an academic and research adviser and a member of a standing committee of the faculty.

May 2005 - August 2005 : **Visiting Research Scientist**, Department of Computer Science, University of Virginia

Designed, implemented, and evaluated a test adequacy component for database-centric applications. Conducted large scale experiments to evaluate the efficiency and effectiveness of a software testing technique for programs that interact with relational databases. Assisted with the coordination of a research group that consisted of five graduate students and one faculty member.

June 1999 - June 2000 : **Research Associate**, Cigital Research Labs

Developed methodologies, proposed hypotheses, designed experiments, and implemented a proof-of-concept prototype to support the testing and analysis of commercial-off-the-shelf (COTS) components. Actively refined the established research process through improvements to the hardware and software infrastructure. Coordinated the management and training of summer interns while also handling many project management issues.

Summer 1997 and Summer 1998 : **Research Intern**, Cigital Research Labs

Designed and implemented a research prototype that integrated into a substantial software testing and analysis tool. Conducted experiments to evaluate research hypotheses about the efficiency and effectiveness of specification-based automated test data generation techniques. Implemented extensions to commercial-grade software testing tools.

Academic Semesters 1996 - 1999 : **Teaching Assistant**, Allegheny College, Department of Computer Science

Provided instructional lectures and assistance to students during laboratory sessions. Prepared and presented lectures for introductory computer science classes. Furnished individual assistance to students during weekly office hours.

Summer 1994 and Summer 1995 : **Instructor**, Duquesne University Multicultural Computer Academy

Developed and presented instructional material for young adults. Taught courses in databases, multimedia, and procedural programming. Acted as a mentor for students with diverse backgrounds and varied computing experience.

## Courses Taught

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- First Year / Sophomore Seminar 102, Software Everywhere  
Year(s): Spring 2008  
Used selected articles from both the popular press and the computer science literature.  
<http://www.cs.alleggheny.edu/~gkapfham/teach/fs102/>
- Computer Science 111 (previously 101), Introduction to Computer Science  
Year(s): Spring 2001 and Fall 2001  
Textbooks: Horstmann. *Computing Concepts with Java 2 Essentials, 4th Ed.*  
Flanagan. *Java in a Nutshell, 2nd Ed.*  
<http://www.cs.alleggheny.edu/~gkapfham/teach/cs101/>
- Computer Science 112 (previously 102), Introduction to Computer Science II  
Year(s): Spring 2003, Spring 2004, Fall 2005, Spring 2006, Fall 2006, Spring 2007, Fall 2007, and Fall 2008  
Textbook: Goodrich and Tamassia. *Data Structures and Algorithms in Java, 4th Ed.*  
<http://www.cs.alleggheny.edu/~gkapfham/teach/cs112/>
- Computer Science 290, Principles of Software Development (New Course)  
Year(s): Fall 2000, Fall 2002, Fall 2004, and Fall 2007  
Textbooks: Sommerville. *Software Engineering, 6th Ed.*  
Hamlet and Maybee. *The Engineering of Software*  
Custom course-pack with selected articles and book chapters.  
<http://www.cs.alleggheny.edu/~gkapfham/teach/cs290/>
- Computer Science 380, Principles of Database Systems  
Year(s): Spring 2007 and Fall 2008  
Textbook: Silberschatz, Korth, and Sudarshan. *Database System Concepts, 5th Ed.*  
<http://www.cs.alleggheny.edu/~gkapfham/teach/cs380/>
- Computer Science 441 (previously 490), Principles of Distributed Systems (New Course)  
Year(s): Spring 2002, Fall 2002, Fall 2005, and Spring 2008  
Textbook: Tannenbaum and van Steen. *Distributed Systems: Principles and Paradigms, 2nd Ed.*  
<http://www.cs.alleggheny.edu/~gkapfham/teach/cs441/>
- Computer Science 550/551, Internship Seminar (New Course)  
Year(s): Spring 2001, Academic Years 2002, 2003, and 2004, Spring 2005-2007, and Fall 2007  
Used selected articles from the computer science and economics literature.  
<http://www.cs.alleggheny.edu/~gkapfham/teach/cs550/>
- Computer Science 580, Junior Seminar  
Year(s): Spring 2000 - 2008  
Used selected articles from the software engineering literature.  
<http://www.cs.alleggheny.edu/~gkapfham/teach/cs580/>
- Computer Science 600, Senior Seminar  
Year(s): Fall 2004  
Used selected articles from the computer science literature.  
<http://www.cs.alleggheny.edu/~gkapfham/teach/cs600/>

## Research Interests

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As an *experimental computer scientist*, the goal of my research is to design, implement, and evaluate techniques and software tools that support the creation of dependable and efficient software applications. This research addresses the challenges within the fields of software engineering, software testing and analysis, and computer systems.

My research is empirical in nature because it involves the application of the *scientific method* to formulate problem statements, carry out experiments, take observations, perform detailed statistical analysis of data sets, and draw conclusions based upon the experimental results. Each research project focuses on the development of computational artifacts that can be used by undergraduate and graduate students, software engineering practitioners, and other computer scientists in both academia and industry.

I am the lead research scientist for each project described in the next section. More information about my research is available at <http://www.cs.allegheeny.edu/~gkapfham/research/>.

## Research Projects

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- Database centric Application Testing tOol ModuleS (DIATOMS),  
<http://www.cs.allegheeny.edu/~gkapfham/research/diatoms/>  
Collaborators: Dr. Mary Lou Soffa (Professor, University of Virginia),  
Dr. Bruce Childers (Associate Professor, University of Pittsburgh)  
Dr. Panos K. Chrysanthis (Professor, University of Pittsburgh),  
Dr. Jeffrey Voas (Director of Systems Assurance, SAIC),  
Bryan Johnston and Evan Kormos (Allegheny College, Class of 2005),  
Joshua Geiger and Gavilan Steinman (Allegheny College, Class of 2008)

Formulating a comprehensive framework to address the challenges that are associated with the efficient and effective testing of database-centric applications. The database-aware approach to testing includes: (i) a fault model, (ii) several unified representations of a program's database interactions, (iii) a family of test adequacy criteria, (iv) a test coverage monitor, and (v) tools for reducing and re-ordering a test suite during regression testing. Analyzed the worst-case time complexity of every important testing algorithm and conducted experiments that measure the efficiency and effectiveness of the database-aware testing techniques.

Research Papers: R1, R4, R5, R6, R14, R16  
Presentations: P4, P6, P11, P13, S6, S10  
Undergraduate Theses: T1, T3, T13, T14

- Approaches to Time-Aware Regression Testing (Kanonizo),  
<http://www.cs.allegheeny.edu/~gkapfham/research/kanonizo/>  
Collaborators: Dr. Mary Lou Soffa (Professor, University of Virginia),  
Dr. Robert S. Roos (Associate Professor, Allegheny College),  
Matthew Rummel (Allegheny College, Class of 2004),  
Kristen Walcott (Allegheny College, Class of 2005),  
Adam Smith (Allegheny College, Class of 2008),  
Alexander Conrad (Allegheny College, Class of 2009)

Addressing the implementation and evaluation of test suite reduction and prioritization techniques that use different types of test adequacy criteria. Designed, implemented, and empirically evaluated algorithms that prioritize the execution of regression test suites that must run in a time constrained fashion.

Research Papers: R3, R7, R8, R9, R10, R11  
Presentations: P1, P2, P3, P7, S4, S5, S7, S11  
Undergraduate Theses: T2, T5, T8, T15, T19, T28, T30

- Techniques for Resource-Constrained Testing (Juggernaut),  
<http://www.cs.allegheeny.edu/~gkapfham/research/juggernaut/>  
Collaborators: Dr. Mary Lou Soffa (Professor, University of Virginia),  
Dr. Daniel Mossé (Professor, University of Pittsburgh),  
Dr. Chandra Krintz (Associate Professor, University of California, Santa Barbara),  
Suvarshi Bhadra (Allegheny College, Class of 2008)

Implementing and evaluating methods for efficiently executing a test suite when memory is limited. Developed an approach that uses code unloading to remove native code bodies that are unlikely to be used during the remainder

of testing. Conducted experiments with real world case study applications in order to measure the efficiency and effectiveness of different configurations of the test execution and prioritization techniques.

Research Papers: R2, R12

Presentations: P12, S1

- Space bEnchmarking and TesTing moduLEs (SETTLE),  
<http://www.cs.allegheeny.edu/~gkapfham/research/settle/>  
Collaborators: Dr. Ahmed Amer (Assistant Professor, University of Pittsburgh),  
Dr. Panos K. Chrysanthis (Professor, University of Pittsburgh),  
Daniel Fiedler and Thomas Richardson (Allegheny College, Class of 2004),  
Anthony Borres and Kristen Walcott (Allegheny College, Class of 2005)

Designing and implementing a benchmarking framework to measure the performance of distributed applications that use tuple space-based middleware. Conducted experiments to measure the throughput and response time characteristics of modern tuple space implementations.

Research Paper: R13

Presentations: P9, P10, P18, S9

Undergraduate Theses: T12

- Frameworks for Distributed Test Suite Execution (Joshua),  
<http://www.cs.allegheeny.edu/~gkapfham/research/joshua/>  
Collaborators: Dr. Robert D. Cupper (Professor, Allegheny College),  
James Clause and Richard Geary (Allegheny College, Class of 2003)

Investigating the conceptual foundation, design, and implementation of techniques that distribute the execution of regression test suites. Experimentally evaluated the performance of distributed regression testing frameworks that handle real world test suites.

Research Papers: R21, R22, R23

Presentation: P19

Undergraduate Theses: T21, T23

- Graphical User Interface Performance (JGP),  
<http://www.cs.allegheeny.edu/~gkapfham/research/jgp/>  
Collaborators: Dr. Robert S. Roos (Associate Professor, Allegheny College),  
Christopher Howell (Allegheny College, Class of 2003),  
Anthony Casini (Allegheny College, Class of 2004)

Proposing experiment designs for the performance analysis of graphical user interfaces (GUIs). Conducted experimental evaluations of the impact that GUI creation frameworks have on the performance of interactive systems. Empirically investigated the run-time performance of two Java GUI creation frameworks, Swing and Thinlet.

Research Paper: R15

Undergraduate Thesis: T17, T24

- Efficient Tuple Space Implementations (RDBSpace),  
<http://www.cs.allegheeny.edu/~gkapfham/research/rdbspace/>  
Collaborators: Dr. Robert S. Roos (Associate Professor, Allegheny College),  
Geoffrey Arnold (Allegheny College, Class of 2002),  
Matthew DeNapoli (Allegheny College, Class of 2003)

Exploring the strengths and weaknesses of current implementations of JavaSpaces, a popular network accessible repository for Java objects that interoperates with the Jini network technology. Designed, implemented, and empirically evaluated RDBSpace, a JavaSpace that is supported by a relational database.

Research Paper: R18

Presentations: P15, P17

Undergraduate Theses: T22, T26

- Parallel Genetic Algorithms (PGA),  
<http://www.cs.allegheeny.edu/~gkapfham/research/pga/>  
 Collaborators: Dr. Robert D. Cupper (Professor, Allegheny College),  
 Dr. Robert S. Roos (Associate Professor, Allegheny College),  
 Brian Zorman (Allegheny College, Class of 2002)  
 Christopher McNamara (Allegheny College, Class of 2003)

Investigating the benefits and drawbacks of several distributed system architectures for parallel genetic algorithms (PGAs). Empirically evaluated the impact that topologies, migration rates, and migrant selection heuristics have on the PGA's convergence time when the solution quality is fixed.

Research Paper: R19

Presentations: P16

Undergraduate Theses: T25, T29

- Quantifying the Performance of Communication and Storage Mechanisms (Swallowtail),  
<http://www.cs.allegheeny.edu/~gkapfham/research/swallowtail/>  
 Collaborators: Brian Blose (Allegheny College, Class of 2006),  
 Jonathan Goytia (Allegheny College, Class of 2006),  
 Jesse Hixson (Allegheny College, Class of 2006),  
 Justin Carulli (Allegheny College, Class of 2007),  
 Philip Burdette (Allegheny College, Class of 2009),  
 William Jones (Allegheny College, Class of 2009)

Implementing performance evaluation frameworks for software systems that include remote communication primitives (e.g., sockets and XML-RPC) and storage techniques (e.g., XML compression and Java serialization). Experimentally identified the fundamental performance trade-offs that are associated with key components of modern software.

Undergraduate Theses: T10, T11, T20, T27, T28, T33

Presentations: P5, P8, S8, S9

## Publications

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- R1 Gregory M. Kapfhammer and Mary Lou Soffa. Database-aware test coverage monitoring. In *Proceedings of the 1st ACM India Software Engineering Conference*, Hyderabad, India, February 2008.
- R2 Suvarshi Bhadra and Gregory M. Kapfhammer. Prioritizing test suites by finding Hamiltonian paths: Preliminary studies and initial results. In *Proceedings of the 3rd IEEE Testing: Academic and Industrial Conference, Fast Abstract Track*, Windsor, England, United Kingdom, August 2008.
- R3 ‡ Gregory M. Kapfhammer. Regression testing, *The Encyclopedia of Software Engineering*. Taylor and Francis, Oxford, England, United Kingdom, December 2008.
- R4 ‡ Gregory M. Kapfhammer. System interoperability testing, *The Encyclopedia of Software Engineering*. Taylor and Francis, Oxford, England, United Kingdom, December 2008.
- R5 Gregory M. Kapfhammer. A comprehensive framework for testing database-centric software applications. PhD Dissertation, University of Pittsburgh, April 2007.
- R6 Gregory M. Kapfhammer. Towards regression testing for database applications. In *Proceedings of the 18th International Workshop on Analysis, Slicing, and Transformation* (Invited Paper), London, England, United Kingdom, October 2007.
- R7 Adam Smith, Joshua Geiger, Gregory M. Kapfhammer, and Mary Lou Soffa. Test suite reduction and prioritization with call trees. In *Proceedings of the 22nd ACM/IEEE International Conference on Automated Software Engineering* (Tool Paper), Atlanta, Georgia, November 2007.
- R8 Gregory M. Kapfhammer and Mary Lou Soffa. Using coverage effectiveness to evaluate test suite prioritizations. In *Proceedings of the 1st ACM International Workshop on Empirical Assessment of Software Engineering Languages and Technologies*, Atlanta, Georgia, November 2007.

- R9 Sara Alspaugh, Kristen R. Walcott, Michael Belanich, Gregory M. Kapfhammer, and Mary Lou Soffa. Efficient time-aware prioritization with knapsack solvers. In *Proceedings of the 1st ACM International Workshop on Empirical Assessment of Software Engineering Languages and Technologies*, Atlanta, Georgia, November 2007.
- R10 Kristen R. Walcott, Mary Lou Soffa, Gregory M. Kapfhammer, and Robert S. Roos. Time-aware test suite prioritization. In *Proceedings of the ACM SIGSOFT/SIGPLAN International Symposium on Software Testing and Analysis*, Portland, Maine, June 2006.
- R11 Matthew J. Rummel, Gregory M. Kapfhammer, and Andrew Thall. Towards the prioritization of regression test suites with data flow information. In *Proceedings of the 20th ACM SIGAPP Symposium on Applied Computing*, Santa Fe, New Mexico, March 2005.
- R12 Gregory M. Kapfhammer, Mary Lou Soffa, and Daniel Mossé. Testing in resource-constrained execution environments. In *Proceedings of the 20th ACM/IEEE International Conference on Automated Software Engineering*, Long Beach, California, November 2005.
- R13 Daniel Fiedler, Kristen Walcott, Thomas Richardson, Gregory M. Kapfhammer, Ahmed Amer, and Panos K. Chrysanthis. Towards the measurement of tuple space performance. In *ACM SIGMETRICS Performance Evaluation Review*, (33):3, December 2005.
- R14 Gregory M. Kapfhammer. Software testing, *The Computer Science Handbook*. CRC Press, Boca Raton, Florida, Second Edition, June 2004.
- R15 Christopher J. Howell, Gregory M. Kapfhammer, and Robert S. Roos. An examination of the runtime performance of GUI creation frameworks. In *Proceedings of the 2nd ACM SIGAPP International Conference on the Principles and Practice of Programming in Java*, Kilkenny City, Ireland, June 2003.
- R16 Gregory M. Kapfhammer and Mary Lou Soffa. A family of test adequacy criteria for database-driven applications. In *Proceedings of the 9th European Software Engineering Conference and the 11th ACM SIGSOFT Symposium on Foundations of Software Engineering*. Helsinki, Finland, September 2003.
- R17 Jennifer Haddox, Gregory M. Kapfhammer, and C.C. Michael. An approach for understanding and testing third-party software components. In *Proceedings of the 48th Reliability and Maintainability Symposium*, Seattle, Washington, January 2002.
- R18 Geoffrey C. Arnold, Gregory M. Kapfhammer, and Robert S. Roos. Implementation and analysis of a JavaSpace supported by a relational database. In *Proceedings of the 8th International Conference on Parallel and Distributed Processing Techniques and Applications*, Las Vegas, Nevada, June 2002.
- R19 Brian Zorman, Gregory M. Kapfhammer, and Robert S. Roos. Creation and analysis of a JavaSpace-based genetic algorithm. In *Proceedings of the 8th International Conference on Parallel and Distributed Processing Techniques and Applications*, Las Vegas, Nevada, June 2002.
- R20 Marcus Bittman, Robert S. Roos, and Gregory M. Kapfhammer. Creating a free, dependable software engineering environment for building Java applications. In *23rd International Conference on Software Engineering, 1st Workshop on Open Source Software Engineering*, Toronto, Canada, May 2001.
- R21 Jennifer Haddox, Gregory M. Kapfhammer, C.C. Michael, and Michael Schatz. Testing commercial-off-the-shelf components with software wrappers. In *Proceedings of the 18th International Conference on Testing Computer Software*, Washington, D.C., June 2001.
- R22 Gregory M. Kapfhammer. Automatically and transparently distributing the execution of regression test suites. In *Proceedings of the 18th International Conference on Testing Computer Software*, Washington, D.C., June 2001.
- R23 Gregory M. Kapfhammer, C.C. Michael, Jennifer Haddox, and Ryan Colyer. An approach to identifying and understanding problematic COTS components. In *Proceedings of the 2nd International Software Assurance and Certification Conference*, Reston, Virginia, September 2000.

‡ denotes a forthcoming paper accepted for publication.

Details about these publications are available at:

<http://www.cs.allegheeny.edu/~gkapfham/research/papers/>

## Presentations

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- P1 The theory and practice of software testing: Can we test it? Yes we can! At SGT Global, Chennai, India, February 2008.
- P2 Set covers, knapsacks, and regression testing techniques. At Madras Christian College, Chennai, India, February 2008.
- P3 Using synthetic coverage information to evaluate test suite prioritizers. At Chennai Mathematical Institute, Chennai, India, February 2008.
- P4 Automatic program instrumentation to the rescue! At the Allegheny College Research in Computer Science Seminar, Meadville, Pennsylvania, February 2007.
- P5 The measured performance of communication and serialization primitives. At the NITLE Workshop on Parallel and Cluster Computing, Easton, Pennsylvania, June 2007.
- P6 The measured performance of database-aware test coverage monitoring. At the University of Pittsburgh Department of Computer Science Colloquium, Pittsburgh, Pennsylvania, September 2007.
- P7 Exploring approaches to time-aware test suite prioritization. At Microsoft Research Asia, Beijing, China, May 2006.
- P8 Measuring the performance of an XML-based communication primitive. At the Allegheny College Research in Computer Science Seminar, Meadville, Pennsylvania, September 2006.
- P9 SETTLE: A tuple space benchmarking and testing framework. At the 9th Jini Community Meeting, Chicago, Illinois, October 2005.
- P10 Further experience with teaching distributed systems to undergraduates. At the 9th Jini Community Meeting, Chicago, Illinois, October 2005.
- P11 A test adequacy infrastructure with database interaction awareness. At the University of California, Santa Barbara Department of Computer Science Colloquium, Goleta, California, November 2005.
- P12 Empirical evaluation of an approach to resource-constrained test suite execution. At the University of Pittsburgh Department of Computer Science Colloquium, Pittsburgh, Pennsylvania, November 2005.
- P13 Testing database-driven applications: challenges and solutions. At the IBM T.J. Watson Research Center, Hawthorne, New York, May 2004.
- P14 A primer on testing database-driven applications. At the Allegheny College Intramural Faculty Conference, Westfield, New York, May 2004.
- P15 Towards a JavaSpace supported by a relational database. At the 6th Jini Community Meeting, Boston, Massachusetts, June 2002.
- P16 Building distributed genetic algorithms with the Jini network technology. At the 6th Jini Community Meeting, Boston, Massachusetts, June 2002.
- P17 Improving the Jini “out of box” experience: lessons learned and solutions provided. At the 6th Jini Community Meeting, Boston, Massachusetts, June 2002.
- P18 Teaching distributed systems to undergraduates: An experience report. At the 6th Jini Community Meeting, Boston, Massachusetts, June 2002.
- P19 An automated wrapping system for Java components and Jini services. At the 17th International Conference on Testing Computer Software, Washington, D.C., June 2000.

Details about these presentations are available at:

<http://www.cs.allegheny.edu/~gkapfham/research/present/>

## Current Research Students

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- Brian Blose (Post-Undergraduate Researcher), Performance Evaluation of Remote Communication Primitives.
- Suvarshi Bhadra (Post-Undergraduate Researcher), Regression Testing Techniques for Memory Constrained Execution Environments.
- Philip Burdette (Undergraduate Researcher), Measuring the Performance of Object Serialization Methods.
- Alexander Conrad (Undergraduate Researcher), Search-Based Approaches to Prioritizing Test Suites.
- Joshua Geiger (Post-Undergraduate Researcher), Using Test Suite Prioritization to Avoid Database Restarts.
- Jesse Hixson (Post-Undergraduate Researcher), Measuring the Performance of Incremental Web Applications.
- William Jones (Undergraduate Researcher), Evaluating Query Languages for Unstructured Heaps.
- Adam Smith (Post-Undergraduate Researcher), Call Tree-Based Testing for Object-Oriented Software.
- Gavilan Steinman (Post-Undergraduate Researcher), Testing XML-Based Software Applications.

Details about these students are available at:

<http://www.cs.alleggheny.edu/~gkapfham/teach/students/>

## Supervised Undergraduate Thesis Research

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- T1 Joshua J. Geiger, Using test suite prioritization to avoid database restarts, Technical Report CS08-02, Graduated: May 2008.
- T2 Adam M. Smith (ACM Student Chapter Prize for the Best Senior Thesis), Incorporating time into test suite reduction and prioritization: An empirical study, Technical Report CS08-05, Graduated: May 2008.
- T3 Gavilan Steinman, A comprehensive framework for the regression testing of procedural XML applications, Technical Report CS08-06, Graduated: May 2008.
- T4 † Bonnie Sands (Joint with the Department of Music), The impact of several variables on fifth-grade public school instrumental music education, Graduated: May 2008.
- T5 Michael Belanich (ACM Student Chapter Prize for the Best Senior Thesis), Using knapsack algorithms to store music on resource constrained devices, Technical Report CS07-01, Graduated: May 2007.
- T6 † Evan Burchard (Joint with the Department of Music), Evolution-inspired composition using Da Elètrico Capo, Graduated: May 2007.
- T7 † Michael Folk (ACM Student Chapter Prize for the Best Senior Thesis and Department of Computer Science Faculty Prize), Dynamic path-based piracy prevention, Technical Report CS07-06, Graduated: May 2007.
- T8 Christopher Johnson, Quantifying the impact of test suite reduction, Technical Report CS07-09, Graduated: May 2007.
- T9 Brian Blose (Department of Computer Science Faculty Prize), Creation and implementation of a security policy, Technical Report CS06-03, Graduated: May 2006.
- T10 Jesse Hixson (ACM Student Chapter Prize for the Best Senior Thesis), Designing incremental Web systems with AJAX: A study of response time, data transfer and throughput on the Web, Technical Report CS06-05, Graduated: May 2006.
- T11 Christopher Allan, An empirical comparison of the performance of character string representations, Technical Report CS06-01, Graduated: December 2006.
- T12 † Anthony Borres, An empirical evaluation of the performance of tuple space monitoring, Technical Report CS05-01, Graduated: May 2005.

- T13 Bryan Johnston, Testing database-centric applications in the presence of schema changes, Technical Report CS05-04, Graduated: May 2005.
- T14 Evan M. Kormos, Testing database-centric Web applications, Technical Report CS05-06, Graduated: May 2005.
- T15 Kristen R. Walcott (ACM Student Chapter Prize for the Best Senior Thesis and Department of Computer Science Faculty Prize), Prioritizing regression test suites for time-constrained execution using a genetic algorithm, Technical Report CS05-11, Graduated: May 2005.
- T16 † Jamie Ball (Joint with the Department of Music), Freehand: On the composition of twelve-tone music, Graduated: December 2005.
- T17 Anthony Casini, Run-time analysis of Java graphical user interfaces, Technical Report CS04-03, Graduated: May 2004.
- T18 Daniel Fiedler, Protection against malicious host attacks and the feasibility of encrypting Java class files, Technical Report CS04-04, Graduated: May 2004.
- T19 Matthew Rummel (ACM Student Chapter Prize for the Best Senior Thesis and Department of Computer Science Faculty Prize), Regression test suite prioritization using data flow information, Technical Report CS04-11, Graduated: May 2004.
- T20 † Jason Figura, A survey of object-oriented databases and their benchmarks, Technical Report CS05-03, Graduated: December 2004.
- T21 James Alexander Clause (ACM Student Chapter Prize for the Best Senior Thesis), A comparison of load balancing and load sharing for the distribution of test cases, Technical Report CS03-02, Graduated: May 2003.
- T22 Mathew J. DeNapoli, Trading spaces for sure: implementing transactional functionality in the RDBSpace implementation, Technical Report CS03-03, Graduated: May 2003.
- T23 Richard Christian Geary (ACM Student Chapter Prize for the Best Senior Thesis), An examination of load sharing and load balancing techniques for distributing test cases, Technical Report CS03-04, Graduated: May 2003.
- T24 † Christopher J. Howell, Implementation and analysis of Java GUI creation frameworks, Technical Report CS03-08, Graduated: May 2003.
- T25 † Christopher McNamara, Experimenting with distributed genetic grouping algorithms, Technical Report CS03-13, Graduated: May 2003.
- T26 Geoffrey Arnold (ACM Student Chapter Prize for the Best Senior Thesis), Trading spaces: Implementation and analysis of a relational database JavaSpaces service, Technical Report CS02-01, Graduated: May 2002.
- T27 Ahmad Rajeh Douglas, The beowulf cluster as an educational tool for teaching parallelism, Technical Report CS02-06, Graduated: May 2002.
- T28 David A. Hollenbaugh, Juggernaut: A tool for mutation testing in Java, Technical Report CS02-10, Graduated: May 2002.
- T29 Brian Zorman (Department of Computer Science Faculty Prize), The creation and analysis of a JavaSpace-based distributed genetic algorithm, Technical Report CS02-18, Graduated: May 2002.
- T30 Marcus Bittman, Creating a free, dependable software engineering environment, Technical Report CS01-03, Graduated: May 2001.
- T31 John Dymond, A solution to the screen resolution problem for the World Wide Web, Technical Report CS01-06, Graduated: May 2001.
- T32 Edmund Gorski, An investigation and analysis of the implementation of a three-deep Web-based information processing solution on a network intranet, Technical Report CS01-07, Graduated: May 2001.

T33 Michael Wilson, TCP over lossy wireless networks: comparison of algorithms and recommendations, Technical Report CS01-18, Graduated: May 2001.

† denotes substantial contributions as a second reader.

Details about these senior theses are available at:

<http://www.cs.allegheeny.edu/~gkapfham/research/thesis/>

## Supervised Student Presentations

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- S1 Suvarshi Bhadra, Alexander Conrad, and Adam Smith. Research in experimental computer science. Allegheny College Summer Research Series, July 2008.
- S2 Michael Folk. Software piracy prevention. Allegheny College Research in Computer Science Seminar, January 2007.
- S3 Michael Folk. Dynamic path-based software piracy prevention. Allegheny College Senior Project Celebration, April 2007.
- S4 Christopher Johnson. Quantifying the impact of test suite reduction. Allegheny College Senior Project Celebration, April 2007.
- S5 Adam Smith. Turning scribbles into science: A tale of undergraduate research. Allegheny College Research in Computer Science Seminar, September 2007.
- S6 Joshua Geiger. Avoiding database restarts with test suite prioritization. Undergraduate Research at the Capitol of Pennsylvania and Allegheny College Summer Research Symposium, October 2007.
- S7 Adam Smith. Using call trees for test suite reduction and prioritization. Allegheny College Summer Research Symposium, October 2007.
- S8 Gavilan Steinman. A divide and conquer approach to developing Web applications. Allegheny College Research in Computer Science Seminar, September 2006.
- S9 Tony Borres. An empirical evaluation of tuple space monitoring and its impact on space performance. Allegheny College Senior Project Celebration, April 2005.
- S10 Evan Kormos. Testing database-centric Web applications. Allegheny College Senior Project Celebration, April 2005.
- S11 Kristen R. Walcott. Prioritizing the execution of time-constrained regression test suites. Allegheny College Senior Project Celebration, April 2005.

Details about these presentations are available at:

<http://www.cs.allegheeny.edu/~gkapfham/research/present/>

## Professional Service

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- Program Committee Member, IEEE International Symposium on Search-Based Software Engineering, December 2008 - May 2009
- Program Co-Chair, IEEE Testing: Academic and Industrial Conference, January-September 2008
- Reviewer, ACM Transactions on Software Engineering and Methodology, January 2008
- Program Committee Member, IEEE International Workshop on Search-Based Software Testing, February 2008
- Reviewer, Communications of the ACM, February 2008
- Reviewer, IEEE Transactions on Software Engineering, March 2008

- Reviewer, Elsevier Journal of Systems and Software, May 2008
- Reviewer, John Wiley and Sons, The Handbook of Technology Management, May 2008
- Reviewer, IEEE Transactions on Software Engineering, June 2008
- Reviewer, Elsevier Journal of Systems and Software, July 2008
- Reviewer, IEEE Transactions on Software Engineering, August 2008
- Reviewer, Elsevier Science of Computer Programming Journal, January 2007
- Program Committee Member, IEEE Testing: Academic and Industrial Conference, May 2007
- Reviewer, IARIA/IEEE International Conference on Software Engineering Advances, May 2007
- Program Committee Member, ACM SIGAPP Principles and Practice of Programming in Java, June 2007
- Reviewer, IEEE Transactions on Computers, July 2007
- Reviewer, IEEE Transactions on Software Engineering, September 2007
- Reviewer, IEEE Transactions on Software Engineering, January 2006
- Reviewer, John Wiley and Sons, The Handbook of Computer Networks, May 2006
- Reviewer, Prentice Hall distributed systems text book (examined thirteen chapters and wrote a twenty-five page review), May 2006
- Program Committee Member, IARIA/IEEE International Conference on Software Engineering Advances, June 2006
- Program Committee Member, ACM SIGAPP Principles and Practice of Programming in Java, June 2006
- Reviewer, IEEE Transactions on Software Engineering, July 2006
- Reviewer, ACM/IEEE International Conference on Software Engineering, October 2006
- Reviewer, ACM SIGSOFT International Conference on the Foundations of Software Engineering, May 2005
- Reviewer, ACM Transactions on Software Engineering and Methodology, September 2005
- Reviewer, ACM/IEEE International Conference on Software Engineering, October 2005
- Reviewer, Prentice Hall distributed systems text book (examined book proposal, chapter outline, and five sample chapters), December 2005
- Reviewer, ACM Transactions on Software Engineering and Methodology, January 2004
- Program Committee Member, ACM SIGAPP Principles and Practice of Programming in Java, February 2004
- Reviewer, ACM Transactions on Software Engineering and Methodology, September 2004
- Reviewer, ACM SIGAPP Symposium on Applied Computing, Track on Distributed Systems and Grid Computing, October 2004
- Reviewer, IEEE International Conference on Distributed Computing Systems, December 2003
- Reviewer, IEE Proceedings - Software Volume 149:1. Special Issue on Open Source Software Engineering, February 2002

## **Institutional Service**

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- Web Site Administrator for the Allegheny College Summer Research Series (ACRoSS) in the Natural Science Division (Details available at: <http://www.cs.allegheny.edu/~gkapfham/research/ACRoSS/>), 2008 - Present

- Member of the Academic Standards and Awards Committee, 2007 - Present
- Convener of the Research in Computer Science Seminar (RICSS) in the Department of Computer Science (Details available at: <http://www.cs.allegheny.edu/~gkapfham/research/RICSS/>), 2006 - Present
- Arrangements for Departmental Lectures, Mr. Gary Groshner (Vice President of Support Systems, Fidelity National Information Services) and Mrs. Jennifer Haddox-Schatz (Research Scientist, Daniel H. Wagner Associates), 2006
- Member of the Department of Computer Science Faculty Search Committee, 2001-2002, 2006, and 2008
- Primary Author of the Applied Computing New Initiative Interim and Final Report, 2002 and 2004

## Additional Activities

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- Lafayette College, NITLE Workshop on Parallel and Cluster Computing, June 2007
- Bowdoin College, Department of Computer Science, Topic: Computer science education, July 2006
- Colby College, Department of Computer Science, Topic: Distributed computing, July 2006
- Allegheny College, Third Biennial Intramural Faculty Conference, May 2004

## Professional Affiliations

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- Association for Computing Machinery (ACM), <http://www.acm.org/>
- Analysis, Slicing, and Transformation Research Network (ASTReNet), <http://www.astre.net.org/>
- "Math Thinking" Group, <http://math-in-cs.org>

## Distinctions

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- Research Adviser for Alexander Conrad, recipient of the Harold M. State Research Fellowship, April 2008
- Academic and Research Adviser for Joshua Geiger, recipient of the Harold M. State Research Fellowship, April 2007
- Research Adviser for Adam Smith, recipient of the Fritts Research Award, April 2007
- Academic and Research Adviser for Kristen R. Walcott, recipient and finalist in the Google Anita Borg Scholarship Competition (<http://www.google.com/anitaborg/>), March 2005 (Finalist) and March 2006 (Recipient)
- Academic and Research Adviser for Kristen R. Walcott, recipient of the National Science Foundation (NSF) Graduate Research Fellowship (\$30,000 academic scholarship to support the completion of a PhD in the Department of Computer Science at the University of Virginia), April 2006
- Academic and Research Adviser for Kristen R. Walcott, honorable mention for the Ford Foundation Diversity Fellowship, April 2006 and 2007
- ACM SIGSOFT Distinguished Paper Award, International Symposium on the Foundations of Software Engineering, September 2003
- Allegheny College Department of Computer Science Faculty Prize, May 1999
- Allegheny College ACM Student Chapter Prize for the Best Senior Thesis, May 1999

GMK, August 13, 2008