James F. Bowring

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1 January 2011

Research Interests

My research interests include software architecture, software engineering, software testing, and statistical behavioral analysis of software systems. The theme of my research is the scientific exploration of software development processes with the twin goals of improving how we model problems and of improving how we design and implement computer-based solutions.

My current research focuses on the collaborative development of cyber infrastructure to encode and support the data processing and associated workflows employed in the earth sciences. This work is supported by grants from the National Science Foundation and private sources.

Education

Ph.D. Computer Science, Georgia Institute of Technology, Atlanta, Georgia
Graduation: December 2006
Dissertation: "Modeling and Predicting Software Behaviors"
Advisors: Mary Jean Harrold and James M. Rehg

BS Summa cum Laude in Computer Science Information Systems, May 2000
College of Charleston, Charleston, South Carolina

BA Summa cum Laude in Historic Preservation & Community Planning, May 2000
College of Charleston, Charleston, South Carolina

Research Experience

College of Charleston, Department of Computer Science, Visiting Assistant Professor 2006-2011

2008 – 2011: *Cyber Infrastructure Research and Development Lab for the Earth Sciences*: I founded and direct CIRDLES, funded through 2009 as a sub-award to an NSF-funded project directed by J. Douglas Walker of the University of Kansas, entitled "Collaborative Project: Facility Support: EarthChem – Advancing Data Management in Solid Earth Geochemistry." In 2010 I was awarded as Principal Investigator the first year of a three-year multi-institution NSF grant entitled "Collaborative Research: Analytical Techniques and Software: Development of Cyber Infrastructure to Support Laser-Ablation ICP Mass Spectrometry." CIRDLES' ongoing open source software development projects are producing an exemplar end-to-end data processing system for uranium-lead geochronological data that links data production to data archiving. This work has also attracted two years of private funding from the Upstream Research Company. We intend this system to be the template for subsequent efforts to process all geochronological

Research Experience (cont.)

data. The website https://CIRDLES.org serves as an international community resource for geochronologists dedicated to advancing their data-processing software. CIRDLES also provides research jobs and internships for undergraduates and foreign exchange students.

2007: *Automated Debugging:* I collaborated with James Jones and Mary Jean Harrold of Georgia Tech to develop machine-learning techniques to assist the automated debugging of programs. This work combines my behavior classification work with Jones' fault-localization work. This work was published in the proceedings of ISSTA 2007 (see publications).

Georgia Institute of Technology, College of Computing, Ph.D. student 2001-2006
Dissertation Summary:

Software systems will eventually contribute to their own maintenance using implementations of self-awareness. Understanding how to specify, model, and implement software with a sense of self is a daunting problem. This research draws inspiration from the automatic functioning of a gimbal - a self-righting mechanical device that supports an object and maintains the orientation of this object with respect to gravity independently of its immediate operating environment. A software gimbal exhibits a self-righting feature that provisions software with two auxiliary mechanisms: a historical mechanism and a reflective mechanism. The historical mechanism consists of behavior classifiers trained on statistical models of data that are collected from executions of the program that exhibit known behaviors of the program. The reflective mechanism uses the historical mechanism to assess an ongoing or selected execution. This dissertation presents techniques for the identification and modeling of program execution features as statistical models. It further demonstrates how statistical machine-learning techniques can be used to manipulate these models and to construct behavior classifiers that can automatically detect and label known program behaviors and detect new unknown behaviors. The thesis is that statistical summaries of data collected from a software program's executions can model and predict external behaviors of the program. This dissertation presents three control-flow features and one value-flow feature of program executions that can be modeled as stochastic processes exhibiting the Markov property. A technique for building automated behavior classifiers from these models is detailed. Empirical studies demonstrating the efficacy of this approach are presented. The use of these techniques in example software engineering applications in the categories of software testing and failure detection are described.

Aristotle Research Group Projects:

Software Tomography: I initiated and performed novel research to develop techniques to dynamically partition testing tasks across a large number of deployed copies of a program. I developed the software that demonstrated empirically the efficacy of the technique for the branch coverage-testing criterion. Software Tomography is now part of the GAMMA project at Georgia Tech.

Research Experience (cont.)

Argo: I initiated and developed novel inter-disciplinary research between software engineering and machine learning that showed that certain event sequences in the execution of a program were stochastic processes that exhibit the Markov property. I developed the Argo system as a discovery tool and for performing empirical studies.

Teaching Experience

College of Charleston, Department of Computer Science

Visiting Assistant Professor, 2006(fall) - 2011(spring)

CSIS-690 (633) Semantic Web Principles and Practice (graduate level)
CSIS-658 Software Testing and Maintenance (graduate level)
CSIS-603 Object-Oriented Design Patterns (graduate level)
CSIS-602 Foundations of Software Engineering (graduate level): 2 instances
CSIS-601 Data Modeling (graduate level)
CSCI-462 Software Engineering Practicum
CSCI-392 Seminar for Seniors :2 instances
CSCI-362 Software Engineering: 3 instances
CSCI-360 Software Architecture and Design: 5 instances
CSCI-332 Database Concepts
CSCI-230 Data Structures and Algorithms (directed study for 1 student)
CSCI-199 Visual and Computational Thinking (Learning Community)
CSCI-110 Computer Fluency: 5 instances
FYSM-117 Designing Responses to Large-Scale Natural Disasters

Curriculum Development

2009: *FYSM-117 Designing Responses to Large-Scale Natural Disasters*: I successfully proposed a first year seminar in which students gain first-hand experience working in teams to propose solutions to the complex, interdisciplinary problem of creating national response strategies for natural disasters. My approach emphasizes computational thinking and "imagineering." Students receive training in skills such as library research, electronic communications and web design. For 2009, the theme is the H1N1 Pandemic. Syllabus at:
www.cs.cofc.edu/~bowring/classes/csis 117/fall 2009/FSYM-117-001-2009-1.pdf

2009: *CSIS-690 (633) Semantic Web Principles and Practice*: I developed the curriculum and course materials for a new graduate course in semantic web technologies. Syllabus at:
www.cs.cofc.edu/~bowring/classes/csis 633/2009 may evening/CSIS_633_SemanticWebPrinciplesAndPracticeSyllabus.2.pdf

2007: *CSCI-199 Visual and Computational Thinking*: I collaborated with Dr. Marian Mazzone, Chair of the Art History Department at the College of Charleston, to create a six credit-hour learning-community course entitled “Visual and Computational Thinking.” The course guides students to analyze and present

Teaching Experience (cont.)

information visually, emphasizing imagination, creativity, and problem solving. Syllabus at:
www.cs.cofc.edu/~bowring/classes/csci 199/CSCI-199-002-2007-7.c.pdf

Georgia Institute of Technology, College of Computing

Research Coordinator, 2005-2006

I supervised two undergraduates as research assistants for three semesters. I also worked with a Master of Science student to extend my research work in modeling software behaviors to the testing legacy systems.

Student Teacher, 2005

I assisted my advisor in teaching CS4001: Computing and Society, fall 2005.

Mentoring Experience

College of Charleston, Department of Computer Science

2009-2011: I mentor a student participating in the South Carolina Alliance for Minority Participation (SCAMP) who works with me in CIRDLES.

2008-2011: I direct and mentor two to four undergraduate student researchers as part of my research efforts at CIRDLES.

2009-2010: I mentored an 8th grade student from Buist Academy by providing a shadowing experience coordinated by the Charleston County School District.

2008-2010: I mentored each year for 12 weeks a Computer Science department internship student from the University of La Rochelle, France as a CIRDLES student researcher.

Manuscripts Submitted for Peer Review

Engineering Cyber Infrastructure for U-Pb Geochronology: Tripoli and U-Pb_Redux. J. Bowring, N. McLean, S. Bowring. SUBMITTED TO: Geochemistry, Geophysics, Geosystems Journal, Dec 2010. American Geophysical Union.

An Algorithm for U-Pb Isotope Dilution Data Reduction and Uncertainty Propagation. N. McLean, J. Bowring, S. Bowring. SUBMITTED TO: Geochemistry, Geophysics, Geosystems Journal, Dec 2010. American Geophysical Union.

Publications (peer reviewed)

Improving consistency in laser ablation geochronology. Horstwood, M., G. Gehrels, and J. Bowring. EOS (2010), Transactions, American Geophysical Union, 91 (28), 247.

Automating U-Pb IDTIMS data reduction and reporting: Cyberinfrastructure meets geochronology. J. Bowring. EOS, Vol. 90, Number 52, 29 December 2009, Fall Meet. Suppl.

Development of the EarthChem Geochronology and Thermochronology database: Collaboration of the EarthChem and EARTHTIME efforts. J. D. Walker, J. M. Ash, J. Bowring, S. A. Bowring, A. L. Deino, R. Kislitsyn, A. Koppers. EOS, Vol. 90, Number 52, 29 December 2009, Fall Meet. Suppl.

Publications (peer reviewed, cont.)

The EARTHTIME Initiative: Progress and Promise. S. Bowring, D. Condon, N. McLean, J. Bowring, K. Johnson, M. Heizler. Proceedings of the 2009 Geological Society of America Joint Annual Meeting, Portland, Oregon, October 2009. Doc # 160-1.

Building Cyber Infrastructure for Geochronology: A Case Study in Collaborative Software Engineering Research. J. Bowring. Proceedings of FSE Workshop on Infrastructure for Research in Collaborative Software Engineering (IRCoSE), November 2008, Atlanta, GA.

Building Cyberinfrastructure for Geochronology: Software Engineering Meets Geochemistry. J. Bowring, N. McLean, J. Walker, S. Bowring. Proceedings of the 2008 Geological Society of America Joint Annual Meeting, Houston, Texas, October 2008. Doc # 142-2.

The EARTHTIME Initiative: A Review of Progress and Prospects. S. Bowring, J. Bowring, D. Condon, M. Heizler, K. Johnson, N. McLean, R. Parrish, J. Ramezani, B. Schoene. Proceedings of the 2008 Geological Society of America Joint Annual Meeting, Houston, Texas, October 2008. Doc # 141-31.

More Than Just An Age: Quantitative Analysis of Geochronological Data and Uncertainty. N. McLean, J. Bowring, S. Bowring, R. Schoene. Proceedings of the 2008 Geological Society of America Joint Annual Meeting, Houston, Texas, October 2008. Doc # 141-28.

Tripoli, U-Pb_Redux, Dzdatabase, and EarthChem: components of an integrated system for archiving, analyzing, and portraying U-Th-Pb geochronologic data. Gehrels, G., Walker, J. D., Bowring, J. F., Bowring, S. A., May, S. Proceedings of 5th Biennial Geochemical SIMS Workshop (BGSW5). P-08. Madison: University of Wisconsin-Madison.

A New Paradigm for Programming Competitions. J. Bowring. Proceedings of the 39th SIGCSE technical symposium on Computer science education. February 2008, Portland, Oregon, vol. 40, pp. 87-91.

Debugging in Parallel. James A. Jones, James F. Bowring, and Mary Jean Harrold. In Proceedings of the 2007 international Symposium on Software Testing and Analysis (ISSTA 207). July 2007, London, United Kingdom, pp. 16-26.

Modeling and Predicting Software Behaviors. James F. Bowring. Dissertation. Georgia Institute of Technology. 2006.

Active Learning for Automatic Classification of Software Behavior. J. Bowring, J. Rehg, M. J. Harrold. Proceedings of the International Symposium on Software Testing and Analysis (ISSTA 2004). July 2004.

TRIPWIRE: Mediating Software Self-Awareness. J. Bowring, J. Rehg, M. J. Harrold. Proceedings of the 2nd ICSE Workshop on Remote Analysis and Measurement of Software Systems (RAMSS '04). May 2004.

Publications (peer reviewed, cont.)
Monitoring Deployed Software Using Software Tomography. J. Bowring, A. Orso, and M. J. Harrold. Proc. of the ACM SIGPLAN-SIGSOFT Workshop on Program Analysis for Software Tools and Engineering (PASTE'02), Nov 2002, Charleston, SC, pp. 2-9.

Published Software (these products are under perpetual development, released frequently)

Tripoli (open source, WinOS, 2002 – 2011): Tripoli is a key component of the cyber infrastructure developed for CIRDLES. Tripoli imports raw mass spectrometer data files and supports interactive visualization of temporal trends, rigorous statistical filtering, and the calculation of statistical parameters. The program exports results in XML, validated by schema, to U-Pb_Redux.
Publish site: http://eaps.mit.edu/research/group/IGLab/tripoli/ or https://CIRDLES.org .

U-Pb_Redux (open source, platform independent, 2006 – 2011): U-Pb_Redux is the second key component for CIRDLES, with full U-Pb data reduction and uncertainty propagation. The program provides sophisticated graphical and statistical tools for data analysis and compilation. These include interactive data tables and concordia and weighted mean plots, dynamic decomposition of uncertainties into contributions from individual sources, and algorithms for propagation of systematic uncertainties. U-Pb_Redux also generates these outputs as publication-ready vector graphics files. It publishes and retrieves entries into to the NSF-sponsored community Geochron database.
Publish site: https://CIRDLES.org .

Technical Reports
Improving the Classification of Software Behaviors using Ensembles of Control-Flow and Data-Flow Classifiers. J. Bowring, M. J. Harrold, J. Rehg. Technical Report GIT-CERCS-05-10. College of Computing, Georgia Institute of Technology, April 2005.

Software Behavior: Automatic Classification and its Applications. J. Bowring, J. Rehg, M. J. Harrold. *Technical Report GIT-CERCS-03-19*. College of Computing, Georgia Institute of Technology, October 2003.

Proceedings Edited
Proceedings of Visual and Computational Teaching and Learning: a conference for college educators. J. Bowring and M. Mazzone, editors. Online at: http://www.cofc.edu/~thinking/docs/T=vc^2.2007.Proceedings.pdf. November 2007.

Research Poster Presentations
Tripoli, U-Pb_Redux, Dzdatabase, and EarthChem: components of an integrated system for archiving, analyzing, and portraying U-Th-Pb geochronologic data. G. Gehrels, D. Walker, J. Bowring, S. Bowring, S. May. 5th Biennial Geochemical SIMS Workshop, June 2008, Madison.

Research Poster Presentations (cont.)
Software Tomography - Enabling Continuous Improvement in Software Engineering. J. Bowring. FSE - 10 Student Research Forum, November 2002, Charleston, SC, USA.

An Application of Recurrence Relations. J. Bowring. Mathematical Association of America 77th Annual Meeting, March, 1998, Charleston, SC

Presentations
A new paradigm for programming competitions. J. Bowring. Paper presented at the ACM Special Interest Group on Computer Science Education (SIGCSE) 2008 Conference, February 2008, Portland, Oregon.

Visual and Computational Thinking. J. Bowring. College of Charleston Panel on Computing in the Liberal Arts and Sciences, April 27, 2007.

Active Learning for Automatic Classification of Software Behavior. J. Bowring. Paper presented at the International Symposium on Software Testing and Analysis, July 2004, Boston, Mass.

TRIPWIRE: Mediating Software Self-Awareness. J. Bowring. Paper presented at the 2nd ICSE Workshop on Remote Analysis and Measurement of Software Systems, May 2004, Edinburgh, Scotland.

Monitoring Deployed Software Using Software Tomography. J. Bowring. Paper presented at the ACM SIGPLAN-SIGSOFT PASTE'02 Workshop, November 2002, Charleston, SC.

Invited Talks
U-Pb_Redux and Tripoli data reduction software demonstration. EarthChem / EARTHTIME / BGS Workshop on Geochronology – U-series. British Geological Survey, Nottingham UK, 21-22 June 2010.

Building Cyber Infrastructure for Geo-Chronology: Software Engineering Meets Geochemistry. J. Bowring. 11th INFORMS Computing Society Conference, Charleston, SC., January 2009.

CIRDLES. J. Bowring. Association for Computing Machinery student chapter, November 2008.

Workshops Organized
EARTHTIME Data Visualization Workshop III. MIT, Cambridge, Mass. September 9–11, 2010.

LA-ICP-MS U-Pb Geochronology Data Handling Workshop. M. Horstwood, G. Gehrels, J. Bowring. San Francisco, Dec 12-13, 2009.

Invited Workshop Participations

Workshop on Working towards a National Geoinformatics Community (NGC). USGS Denver Federal Center, 23-24 Sept 2010.

EarthChem / EARTHTIME / BGS Workshop on Geochronology – U-series. British Geological Survey, Nottingham UK, 21-22 June 2010.

EARTHTIME Data Visualization Workshop II. MIT, Cambridge, Mass. September 10–12, 2009.

EARTHTIME/EarthChem-sponsored workshop EARTHTIME IV focusing on data acquisition, manipulation, processing, visualization, and archiving for high-precision U-Pb and Ar-Ar geochronology. May 1-3 2009. Denver, Colorado. http://www.earth-time.org/meetings.html

EARTHTIME Data Visualization Workshop. MIT, Cambridge, Mass. October 5-7, 2007.

EarthChem Workshop on Geochronology of Uranium-Lead. University of Kansas, April 2007

Research / Development Collaborative Meetings

Encoding of LA-ICP MS workflow as performed at Arizona Laserchron Center, University of Arizona. George Gehrels, Director. 22-23 Jan 2010.

Encoding of LA-ICP MS workflow as performed at the Radiogenic Isotope and Geochronology Laboratory, Washington State University. Jeffrey Vervoort, Director. 25-27 Feb 2010.

Conference Sessions Convened

EARTHTIME and the Frontiers of U-Pb Geochronology II. J. Bowring (Chair), S. Bowring, N. McLean, G. Gehrels. American Geophysical Union Fall Meeting, San Francisco, CA, Dec 2009.

Conferences Organized

College of Charleston, Department of Computer Science

In 2007, I collaborated with Dr. Marian Mazzone, Chair of the Art History Department to create and host a conference in conjunction with the course we were teaching (see CSCI-199 above.) The conference was called: Visual and Computational Teaching and Learning: a conference for college educators and was held November 16-17, 2007. Our motivation was that the liberal arts and sciences are embracing the computer revolution on a worldwide basis as educators create new courses to explore the interplay of computing and other disciplines. There is a common theme of visual and computational creativity at the core of these efforts. For both teachers and students the computer as a medium increasingly shapes how we think, work, and create. Digitized visual representations of information are becoming ubiquitous in our computerized culture, thus in the 21st century, students need to know how to analyze and manipulate representations of information on the computer effectively.

Details and proceedings at: http://www.cofc.edu/~thinking .

Invited External Reviews
2010 – Journal of Information and Software Technology: 2 manuscripts
2009 – Journal of Information and Software Technology: 2 manuscripts
2009 – Pearson Education: 2 textbook chapters
2008 – Journal of Information and Software Technology: 3 manuscripts
2008 – Pearson Education: 1 textbook chapter
2006 – International Conference on Software Engineering (ICSE)

Invention Disclosure
Automatic Classification of Software Behaviors. J. Bowring, J. Rehg, M. J. Harrold. Invention Disclosure 2999. Office of Technology Licensing, Georgia Institute of Technology, Oct 2003.

Research Grants
2010: NSF Award #0930223: Collaborative Research: Analytical Techniques and Software: Development of CyberInfrastructure to Support Laser-Ablation ICP Mass Spectrometry I. $127,478.

2010: Upstream Research Company: Support for the Detrital Zircon Geochronology Database II. $35,000.

2009: Upstream Research Company: Support for the Detrital Zircon Geochronology Database I. $35,000.

2009: Sub-award of NSF award #0522222: Collaborative Project: Facility Support: EarthChem - Advancing Data Management in Solid Earth Geochemistry II. $39,190.

2008: Sub-award of NSF award #0522222: Collaborative Project: Facility Support: EarthChem - Advancing Data Management in Solid Earth Geochemistry I. $97,291.

Fellowships and Honors
Georgia Institute of Technology Graduate School:
- National Defense Science and Engineering Graduate Fellowship, 2001-2004
- Georgia Institute of Technology President's Fellowship, 2001-2005
- Phi Kappa Phi Graduate Fellowship, 2001-2002
- Awarded ACM SIGSOFT CAPS scholarship to attend FSE 2002
- Awarded ACM SIGSOFT CAPS scholarship to attend ICSE 2002

College of Charleston Undergraduate School:
- Awarded Outstanding Student Computer Science, 2000
- Awarded Departmental Honors, Outstanding Student Historic Preservation, 2000
- Lindstedt Scholarship in Historic Preservation, 1999 - 2001
- Golden Key National Scholarship, 1999
- Winning Teahouse design erected as sculpture on College of Charleston Campus, 1999

Professional Affiliations
Association for Computing Machinery (ACM)
IEEE Computer Society
American Geophysical Union (AGU)

Service Activities
Faculty advisor to ACM student chapter, College of Charleston, 2006 – 2011
- Produce and host annual High School Programming Competitions
- Organize and coach collegiate programming competition teams

Coordinator of CS Annual Alumni Symposium, 2008-2011
CS Dept. committee to design, implement and evaluate a 21st century classroom, 2009-2011
Provide mentoring support to SCAMP student, 2009-2011
CS Dept. curriculum committee head, 2010-2011
Volunteer for Teaching Open Source collaboration, 2010-2011
Coordinate student trip to Palmetto Open Source Software Conference, Columbia, SC, 2010
Volunteer for Lowcountry Computer Science Camp (CS and SC Computing Consortium), 2010
Judge for Lowcountry Science Fair, Charleston, SC, 2007 – 2008, 2010
CS Dept. committee for internships and mentoring programs with industrial partners, 2009
CS Dept. hiring committee for a department administrator, 2009
CS Dept. committee that developed Service-Oriented Computing certificate program, 2009
Organize the annual Spring CS Alumni Reunion Events, 2008 – 2009
Faculty participant in Learning Community / FYE initiative, College of Charleston, 2007, 2009
Faculty coordinator for Computing Outreach Lecture Series, 2006 – 2009
Volunteer at SEWEE Visitor and Environmental Center, 2008 – 2009
CS Dept. committee to develop a new Business Informatics degree, 2008
Organize and host the Employer Meet and Greet for CS students, 2008
Co-organizer of Conference on Visual and Computational Thinking and Learning, 2007
Coordinator for student trip to Department of Energy Day of Science, Knoxville, TN., 2007
Participated in writing successful NSF grant application for Highly Dependable Computing and Communication Systems Research (HDCCSR), Georgia Tech, 2004
College of Computing, Georgia Tech, Graduate Student Tea Organizer, 2004
Atlanta Mayor's Office of Community Technology, Volunteer, 2003 – 2004
Town of Mount Pleasant, SC, Commercial Development Design Review Board, 2000 – 2001
President ACM student chapter, College of Charleston, 1999 – 2000
Board Member, Moultrie Middle School PTA, Mount Pleasant, SC, 1995 – 1996
Membership Chair, Charleston, SC Chapter, Construction Specifications Institute, 1991–1992

Professional Experience – Computing
MedicAllInOne, LLC, James Island, South Carolina, Owner, 2000 – present, Software architect
Software: *TheVaccinator* – Immunization Management System, http://www.MedicAllInOne.com

Sunchex Systems, LLC, Mount Pleasant, SC, Owner, 1980 – present, Software architect
Software: *Tripoli* – Mass Spectrometry Statistics: (now open-source via https://CIRDLES.org)
http://eaps.mit.edu/research/group/IGLab/tripoli/
Tangiers – Fisons Plasmaquad Data Reduction: TheBowringCompany.com/Tangiers/
AccountMaster – Job and General Accounting System for Contractors – by request

Professional Experience – Computing (cont.)
CAMmatic, Inc., Mount Pleasant, South Carolina, 1999 - 2007
Consultant Software Engineer for *RPWorks* - Rapid Prototyping solutions

Charleston Air Force Base, Phoenix Star Quality Management, 1998 – 2000, Software architect
Software: *PhoenixStar2000* – Quality control management software, proprietary

Compusult, Inc., Charleston, South Carolina, 1995 – 2002, Software architect
Software: *CCM* – Contact and contract management system, proprietary

Bolt, Beranek, and Newman, Cambridge, Massachusetts, 1969 – 1970
Lisp Programmer in Artificial Intelligence lab, directed by Dr. Daniel Bobrow

Project MAC, Massachusetts Institute of Technology, Cambridge, Mass., 1967
Lisp Programmer in Artificial Intelligence lab, directed by Dr. Seymour Papert

Entelek, Inc., Gloucester, Massachusetts, 1966 – 1968
Student Software Consultant for Educational Products Division (volunteer)

Berkeley Enterprises, Inc., Publisher of "Computers and Automation," Newton, Mass., 1966 – 1968
Student Consultant to owner Edmund C. Berkeley (volunteer)

Professional Experience – General Contractor
The Bowring Company LLC, Mt. Pleasant, South Carolina, Owner, 1996 – 2004
Construction Management, Inspections, Estimating, Forensic Investigations

Palmetto Craftsmen, Inc., Charleston, South Carolina, Owner (1/2), 1991 – 1996
Licensed General Contractor

Landmark Land Company of Carolina, Inc., Kiawah Island, SC, 1989 – 1991
Vice President for Construction, Licensed General Contractor

The Beach Company / Associated Contractors of Charleston, Charleston, SC, 1988 – 1989
Executive Vice President, Licensed General Contractor

James & Sun Construction, Inc., Mt. Pleasant, South Carolina, Owner, 1980 – 1988
Design/Build General Contractor specializing in custom homes, solar applications

Engineering, Surveying, and Planning, Inc., Charleston, South Carolina, 1979 – 1980
Survey Party Chief

Wilkinson Surveying and Engineering, Inc., Dunbar, West Virginia, 1978 – 1979
Survey Party Chief

James F. Bowring – Sole Proprietor, Philadelphia, Pennsylvania, 1973 – 1978
Contractor specializing in historic renovations and remodeling

Professional Licenses
Residential Home Inspector, South Carolina, 1996 – 2004
General Contractor Unlimited Residential, South Carolina, 1980 – 2004
General Contractor Unlimited Buildings, South Carolina, 1988 – 2000