Curriculum Vitae

James F. Bowring

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General Information

College of Charleston, Charleston, SC
Department of Computer Science
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Lab: Cyber Infrastructure Research and Development Lab for the Earth Sciences - www.CIRDLES.org and www.github.com/cirdles

Research Interests

My research interests include software architecture, software engineering, software testing, and statistical behavioral analysis of software systems. The theme of my current research is the scientific exploration of software development processes within the constraints of a specific science domain 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, September 2001 – December 2006
Georgia Institute of Technology, Atlanta, Georgia
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

Professional Experience - Computing

Assistant Professor, Department of Computer Science, College of Charleston, August 2011-present.
Visiting Assistant Professor, Department of Computer Science, College of Charleston, August 2010 – May 2011.
Visiting Assistant Professor, Department of Computer Science, College of Charleston, August 2006 – May 2010.
MedicAllInOne, LLC, Mount Pleasant, South Carolina, Owner, 2000 – present, Software architect, engineer
Sunchex Systems, LLC, Mount Pleasant, SC, Owner, 1980 – present, Software architect, engineer
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, engineer
Compusult, Inc., Charleston, South Carolina, 1995 – 2002, Software architect, engineer
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
Berkeley Enterprises, Inc., Publisher of "Computers and Automation," Newton, Mass., 1966 – 1968, Student Consultant to owner Edmund C. Berkeley

Teaching Experience - College of Charleston, Dept. of Computer Science

Assistant Professor, 2011(fall) – 2016 (spring), including summers
CSCI-220L Programming I Lab
CSCI-230 Data Structures and Algorithms
CSCI-325 Functional and Logic Programming
CSCI-362 Software Engineering (8 instances)
CSCI-397 Research Topic (39 instances, no credit)
CSCI-399 Independent Study (9 instances)
CSCI-462 Software Engineering Practicum (7 instances)
CSCI-490 Independent Study (2 instances)
CSCI-499 Bachelor's Essay (4 instances)
CSIS-633 Semantic Web Principles and Practice (graduate level)
CSIS-658 Software Testing and Maintenance (3 instances graduate level)
CSIS-691 Independent Study (graduate level)

Teaching Experience - College of Charleston, Dept. of Computer Science (cont.)

Visiting Assistant Professor, 2010 (fall) – 2011 (spring)

CSCI-360 Software Architecture and Design
CSCI-362 Software Engineering
CSCI-462 Software Engineering Practicum
CSIS-603 Object-Oriented Design Patterns (graduate level)

Visiting Assistant Professor, 2006 (fall) – 2010 (spring)

FYSM-117 Designing Responses to Large-Scale Natural Disasters
CSCI-110 Computer Fluency (5 instances)
CSCI-199 Visual and Computational Thinking (Learning Community)
CSCI-230 Data Structures and Algorithms (directed study for 1 student)
CSCI-332 Database Concepts
CSCI-360 Software Architecture and Design (4 instances)
CSCI-362 Software Engineering (3 instances)
CSCI-392 Seminar for Seniors
CSIS-601 Data Modeling (graduate level)
CSIS-602 Foundations of Software Engineering (2 instances, graduate level)
CSIS-658 Software Testing and Maintenance (graduate level)
CSIS-690 (633) Semantic Web Principles and Practice (graduate level)

Curriculum Development

2012: *CSCI-230 Data Structures and Algorithms:* I updated this course by introducing the practice of having students present their programming assignments for review by their classmates in the manner of studio art classes. The learning objective was to give confidence and knowledge about the wide range of possible solutions to a given problem. Syllabus at:
http://www.cs.cofc.edu/~bowring/classes/csci%20230/fall%202012/CSCI-230-001-2012.pdf

2011-2016: *CSCI-462 Software Engineering Practicum:* I updated this course in 2011, with annual improvements driven by student input, so that the students are required to form teams and to select, join, and contribute to an active open source development community. This provides real-world practical experience with industrial-scale software systems similar to those the students will encounter in their careers. Also, I introduced the requirement that each student contribute 1000 words or more per week to a public, professional blog recounting their assignments and progress. Students are required to attend the Palmetto Open Source Software Conference in Columbia SC and to meet and interview at least three of the speakers. Syllabus at:
http://stono.cs.cofc.edu/~bowring/classes/csci%20462/2016%20Spring/section%2001/CSCI-462-001-2016.pdf

Teaching Experience - College of Charleston, Dept. of Computer Science (cont.)

Curriculum Development (cont.)

2011-2015: *CSCI-362 Software Engineering:* I updated this course in 2011, with annual improvements driven by student input, so that the students are required to form into teams tasked with developing a prototype testing environment for an open source software product. The project is designed to have the students experience on a small scale a realistic team-based software development effort informed by their readings. In 2014 and 2015, students were required to participate in Charleston's Start-Up Weekend. Syllabus at: http://stono.cs.cofc.edu/~bowring/classes/csci%20362/fall%202015/CSCI-362-2015.pdf

2009 (fall): *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 problem solving. 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 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

Teaching Experience - Georgia Institute of Technology, College of Computing

2005-2006: *Research Coordinator:* 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.

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

Mentoring Experience - College of Charleston, Dept. of Computer Science

2012-2016: I train with the College's Mentoring Matters, and mentor a student each year.

2015-2016: I mentor a Computer Science student at Georgia Tech.

2010–2016: I advise many CS majors per year, as do all roster faculty.
2010-11=6; 2011-12=11; 2012-13=46; 2013-14=41; 2014-15=54; 2015-2016: 48.

2010-2011: I mentor a student in the McNair Scholars Program to a successful admission to the Ph.D. program in Computer Science at North Carolina State.

2009-2016: I mentor each year a student participating in the South Carolina Alliance for Minority Participation (SCAMP) who works with me in the Cyber Infrastructure Research and Development Lab for the Earth Sciences (CIRDLES).

2008-2016: I direct and mentor two to eight undergraduate student researchers each semester and summer as part of my research efforts at CIRDLES.

2008-2015: I mentored each year, except 2013, for 12 weeks a Computer Science department internship student from the University of La Rochelle, France as a CIRDLES student researcher.

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

Research Experience - College of Charleston, Dept. of Computer Science

2007–present: In 2007, I formed the Cyber Infrastructure Research and Development Lab for the Earth Sciences (CIRDLES.org) to advance the collaborative development of domain-specific software systems. The first project was to develop a prototype system to support uranium-lead geochronology workflows and evaluate the feasibility of a longer -term commitment to this effort. I received a supplemental grant on an NSF project: EARTHCHEM: Advancing Data Management in Solid Earth Geochemistry for January 2008 to August 2009, including one extension. My award as PI was EAR-0522222 for $97,291. Subsequently, I am the PI with co-PIs from MIT, University of Arizona, and University of Kansas on an NSF project: Collaborative Research: Analytical Techniques and Software: Development of CyberInfrastructure to Support Laser-Ablation ICP Mass Spectrometry for June 2010 to May 2016, including three no-cost extensions and a supplemental award. My award was EAR-0930223, $321,911, supplemental of $31,894. Currently I am also the PI with co-PIs from University of Florida, University of Kansas, and University of

Research Experience - College of Charleston, Dept. of Computer Science (cont.)

Hawaii on an NSF project: CIF21 DIBBs: Collaborative Research: Cyberinfrastructure for Interpreting and Archiving U-series Geochronologic Data for September 2014 to August 2017. My award was #1443037 for $579,762. Each project builds on the work of its predecessor.

The work successfully pioneered and advanced collaboration among software engineers and geoscientists who discovered, refined, and encoded the workflow, mathematics, visualizations, and data flow of U-Pb thermal ionization (ID-TIMS) and U-Th-Pb laser ablation (LA-ICP-MS) geochronology. It developed and extended cyberinfrastructure composed of domain-specific software (*Tripoli* and *ET_Redux* (previously U-Pb_Redux)) and web services exposing a data repository (NSF-funded EarthChem's Geochron.org) that satisfies NSF's data management criteria and provides an exemplar solution for the NSF EarthCube initiative. The work: 1) develops the mathematical models for age calculations and uncertainty propagation for ID-TIMS, LA-ICPMS and legacy U-series; 2) implements the science workflows, new data reduction protocols, and interactive visualizations to support them with software products Tripoli and ET_Redux; 3) produces working cyberinfrastructure for TIMS and LA-ICP-MS U-Pb geochronology that provides a seamless transition from lab to analysis to publication to archiving and retrieval by integrating mass spectrometer software, *Tripoli*, *ET_Redux*, and the Geochron.org data repository; 4) developed a new open source testing tool for Java programs, *Obsidian*; and 5) developed a prototype teaching tool, *MathMachine*, that allows developers to interactively present the working mathematics of data reduction software to users.

Furthermore, the work is developing cyberinfrastructure for geochronologists in concert with the greater Earth Science community and in training students: 1) CIRDLES.org and github.com/cirdles provide community discussion forums and downloads of the most recent builds of our open source software; 2) PI Bowring organized and hosted at the College of Charleston an international workshop of LA-ICP-MS geochemists and software authors to explore the state-of-the-art and future directions for geochronology-specific software; 3) PI Bowring is a sub-awardee of the University of Arizona's NSF-funded EarthCube Test Enterprise Governance: An Agile Approach, as a member of the Organizational Management Group, and is PI of the EarthCube Software Engineering Community of Practice special interest group; 4) PI Bowring has had three to eight undergraduate research assistants each year, three of whom produced senior theses on their work. In addition, five were members of the South Carolina Alliance for Minority Participation (SCAMP), and one is pursuing a Ph.D. at the University of North Carolina with an NSF fellowship. The University of LaRochelle, France, which is a sister to the College of Charleston, provided a computer science intern for 12 weeks to work with PI Bowring in all but one year.

Research Experience - Georgia Institute of Technology, College of Computing

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).

2001-2006, Ph.D. Student

"Modeling and Predicting Software Behaviors", 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.

2002-2006: 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- Georgia Institute of Technology, College of Computing (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.

Journal Articles, Peer Reviewed (* denotes student)

McLean, N., Bowring, J. F., & Gehrels, G. (2016). Algorithms and software for U-Pb geochronology by LA-ICPMS. Geochem. Geophys. Geosyst., 2016, doi:10.1002/2015GC006097, 15252027.

Bowring, J. & Burke, Q. (2016). Shaping Software Engineering Curricula using Open Source Communities. Journal of Interactive Learning Research. 27 (1), pp. 5-26. Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).

Horstwood, M. S., Kosler, J., Gehrels, G., Jackson, S. E., McLean, N. M., Paton, C., Pearson, N. J., Sircombe, K., Sylvester, P., Vermeesch, P., Bowring, J. F., & others (2016). Community-Derived Standards for LA-ICP-MS U-Th-Pb Geochronology–Uncertainty Propagation, Age Interpretation and Data Reporting. Geostandards and Geoanalytical Research. doi: 10.1111/j.1751-908X.2016.00379x

Bowring, J. F., *Hegler, H. (2014), "Obsidian: Pattern-Based Unit Test Implementations", Journal of Software Engineering and Applications, 7 (2), 94-103.

Bowring, J. F., McLean, N. M., and Bowring, S. A., "Engineering cyber infrastructure for U-Pb geochronology: Tripoli and U-Pb_Redux", Geochem. Geophys. Geosyst. (2011), 12, Q0AA19, doi:10.1029/2010GC003479.

McLean, N. M., Bowring, J. F., and Bowring, S. A., "An algorithm for U-Pb isotope dilution data reduction and uncertainty propagation", Geochem. Geophys. Geosyst. (2011), 12, Q0AA18, doi:10.1029/2010GC003478.

Publications, Peer Reviewed

McCauley, R., Anderson, P., Bowring, J., Manaris, B., Pothering, G., Starr, C., Patterson, L., and Besmer, A., "Beyond the traditional: computing degrees for broadening participation", J. Computing. Sci. Coll. 30, 2 (December 2014), 229-230.

Anderson, P., Bowring, J., McCauley, R., Pothering, G., and Starr, C., "An undergraduate degree in data science: curriculum and a decade of implementation experience", In Proceedings of the 45th ACM technical symposium on Computer

Publications, Peer Reviewed (cont.)

science education (SIGCSE 2014). ACM, New York, NY, USA, 145-150. DOI=10.1145/2538862.2538936 http://doi.acm.org/10.1145/2538862.2538936

Bowring, J., Horstwood, M., and Gehrels, G. (2013), "Resolving Bias in Laser Ablation Geochronology", Eos Trans. AGU, 94(24), 217.

Bowring, J. F. and Pearthree, G. M. (2012), "EarthCube's Governance Working Group Steering Committee presents roadmap", Eos Trans. AGU, 93(41), 406.

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

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

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

Jones, J. A., Bowring, J. F., and Harrold, M. J., "Debugging in Parallel", In Proceedings of the 2007 International Symposium on Software Testing and Analysis (ISSTA 2007). July 2007, London, United Kingdom, pp. 16-26.

Bowring, J. F., "Modeling and Predicting Software Behaviors", Dissertation. Georgia Institute of Technology. 2006.

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

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

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

Abstracts and Posters, Peer Reviewed (* denotes student)

Bowring, J., McLean, N., Walker, J., Gehrels, G., Bowring, S., "Advanced Cyberinfrastructure for Geochronology as a Collaborative Endeavor: A Decade of Progress, A Decade of Plans", invited for presentation at American Geophysical Union Fall 2015 Meeting.

*Zeringue, J. and Bowring, J. F., "Building Interactive Visualizations for Geochronological Data", American Geophysical Union, Fall Meeting 2014, abstract #IN41A-3639.

*Nettles, J. and Bowring, J. F., "CHRONI - an Android Application for Geochronologists to Access Archived Sample Analyses from the NSF-Funded Geochron.org Data Repository", American Geophysical Union, Fall Meeting 2014, abstract #IN41A-3640.

Walker, J.D., J.Ash, J.F. Bowring, S.A. Bowring, and N.M. McLean, "The Geochron System for Sharing and Archiving Geochronology Data: New Advances in Data Management", Proceedings of the 2013 Geological Society of America Joint Annual Meeting, Denver, CO., October 2013.

Bowring, J. F.; *McLean, N.; Walker, J. D., and Ash, J. M., "Automating U-Pb IDTIMS data reduction and reporting: Cyberinfrastructure meets geochronology", American Geophysical Union, Fall Meeting 2009, abstract #V33B-2034.

Walker, J.D., Ash, J.M., Bowring, J., Bowring, S. A., Deino, A. L., Kislitsyn ,R., and Koppers, A. "Development of the EarthChem Geochronology and Thermochronology database: Collaboration of the EarthChem and EARTHTIME efforts", American Geophysical Union, Fall Meeting 2009, abstract #V53B-08.

*McLean, N. M., Bowring, J.F., and Bowring, S.A., "Using statistics and software to maximize precision and accuracy in U-Pb geochronological measurements", American Geophysical Union, Fall Meeting 2009, abstract #V33B-2033.

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

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

Abstracts and Posters, Peer Reviewed (* denotes student) (cont.)

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

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

Gehrels, G., Walker, J. D., Bowring, J. F., Bowring, S. A., May, S., "Tripoli, U-Pb_Redux, Dzdatabase, and EarthChem: components of an integrated system for archiving, analyzing, and portraying U-Th-Pb geochronologic data", Proceedings of 5th Biennial Geochemical SIMS Workshop (BGSW5). P-08. Madison: University of Wisconsin, Madison. 2008.

Published Open-Source Software (perpetual development)

Tripoli (open source, WinOS, 2002 – present): *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 – 2014: *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 via the NSF-sponsored community Geochron archival database.
Publish site: https://CIRDLES.org .

ET_Redux (open source, platform independent, 2015 – present: *ET_Redux* extends *U-Pb_Redux* as the software system evolves to include additional isotope systems such as the uranium series under current NSF funding.
Publish site: https://github.com/cirdles/et_redux .

Published Open-Source Software (perpetual development) (cont.)

Topsoil (open source, platform independent, 2014 – present: *Topsoil* is a desktop application and Java library that creates data visualizations for geochronologists and other earth scientists. It replaces the deprecated Isoplot program.
Publish site: https://github.com/cirdles/topsoil .

Published Commercial Software

TheVaccinator –Immunization Management System, http://www.MedicAllInOne.com

Technical Reports

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

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

Workshops Organized

Bowring, J. F., Horstwood, M., Gehrels, G., "Handling, Processing, and Archiving of LA-ICP-MS U-Th-Pb Data: Statistical Interpretation of Age Information", College of Charleston, Charleston, SC. March 6-8, 2013.

Bowring, J. F., McLean, N.,M., Bowring, S. A., "EARTHTIME Data Visualization Workshop III", MIT, Cambridge, Mass. September 9–11, 2010.

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

Presentations and Invited Talks

Bowring, J., "Advanced Cyberinfrastructure for Geochronology as a Collaborative Endeavor: A decade of Progress, A Decade of Plans", invited presentation for American Geophysical Union Fall 2015 Meeting, December 2015.

Bowring, J., "Advanced Cyberinfrastructure for Geochronology as a Collaborative Endeavor", invited talk to Department of Geology Colloquium Series, University of Kansas, 19 November 2015.

Bowring, J. F., "Advanced Cyberinfrastructure for Geochronology as a Collaborative Endeavor", Webinar presented to EarthCube Research Coordination Network for the Internet of Samples, 11 November 2015.

Presentations and Invited Talks (cont.)

Bowring, J., “Research as Adventure”, invited talk to the College of Charleston Phi Kappa Phi Honor Society chapter new members, 10 September 2015.

Bowring, J. “Engineering Cyber Infrastructure for U-Th-Pb Geochronology”, presented at the SHRIMP Data Processing Workshop, Canberra, Australia, 4 March 2015.

Bowring, J. F., "Automating Workflow from Raw Data to Repository: Collaborative Software Engineering”, NSF Workshop on Deep Time Data, American Geophysical Union Fall Meeting, San Francisco CA, December 2014.

Bowring, J. F., "Automating Workflow from Raw Data to Repository: Collaborative Software Engineering”, Webinar presented to EarthCube Research Coordination Network for Collaboration and Cyberinfrastructure for Paleogeosciences, September 2014.

Bowring, J. F., "Automating Workflow from Raw Data to Repository: Collaborative Software Engineering”, EarthCube Domain End-User Workshop for Rock Deformation and Mineral Physics, Alexandria, VA, 13 November 2013.

Bowring, J.F., “Automating Workflow from Raw Data to repository”, EarthCube Domain End-User Workshop for Geochronology, NSF, Madison, WI, October, 2013.

Bowring, J.F., “Research Opportunities and Graduate School”, South Carolina Alliance for Minority Participation (SCAMP) student meeting, September, 2013.

Bowring, J.F., “EarthCube Report to ESIP: End-User Workshops”, Presentation to Federation of Earth-Science Information Partners (ESIP) Summer Meeting, July, 2013.

Bowring, J. F., “U-Pb_Redux and Tripoli data reduction software demonstration”, University of Arizona Laserchron Data Processing Workshop. University of Arizona, Tucson, AZ. May 2013.

Bowring, J. F., “Engineering Cyber Infrastructure for U-Pb Geochronology”, SPAWAR Charleston Professional Development. SPAWAR Charleston, SC. November 2012.

Bowring, J. F., “Automating Workflow from Raw Data to Repository”, EarthCube Domain End-User Workshop for Structural Geology and Tectonics. NSF. Chicago, IL. October 2012.

Presentations and Invited Talks (cont.)

Bowring, J. F., "Here We Come, Ready or Not: Undergraduate Software Engineering Practicum in Open Source", Palmetto Open Source Software Conference (POSSCON), IT-Ology, Inc., Columbia, SC. March 2012.

Bowring, J. F., "The Semantic Web: Building and Using Smart Data", Charleston Java Users' Group, Bibliolife, Inc., Charleston, SC. November 2011.

Bowring, J. F., "U-Pb_Redux and Tripoli data reduction software demonstration", EARTHTIME Data Visualization Workshop III, MIT, Cambridge, Mass. September 2010.

Bowring, J. F., "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.

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

Bowring, J. F., "Development of the EarthChem Geochronology and Thermochronology database: Collaboration of the EarthChem and EARTHTIME efforts", American Geophysical Union Fall 2009 Meeting, San Francisco, CA.

Bowring, J. F., "Cyber Infrastructure Research and Development Lab for the Earth Sciences", Association for Computing Machinery student chapter, November 2008.

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

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

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

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

Presentations and Invited Talks (cont.)

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

Invited Workshop, Panel, and Conference Participation

The Internet of Samples in the Earth Sciences (iSamples) Planning Workshop II, NSF, EarthCube.org, Chapel Hill, NC, January, 2016.

Earth-Centered Communication for Cyberinfrastructure – Challenges of Field Data Collection, Management, and Integration: A Five-day Field Trip for Geoscientists and Computer Scientists to Explore Cyberinfrastructure Creation, NSF, EarthCube.org, August 2-7, 2015, Bishop, CA.

EarthCube All Hands Meeting, NSF, EarthCube.org, Washington, DC., May, 2015.

Palmetto Open Source Conference (POSSCON). It-Ology. Columbia, SC. April, 2015.

The Internet of Samples in the Earth Sciences (iSamples) Planning Workshop, NSF, EarthCube.org, Austin, TX, January, 2015.

EarthCube Check and Adjust Meeting, NSF, EarthCube.org, Tucson, AZ, January, 2015.

Beyond the Traditional: Computing Degrees for Broadening Participation, Consortium for Computing Sciences in Colleges, Conference Panel, Charleston, SC, November 2014.

EarthCube Research Coordination Network for Collaboration and Cyberinfrastructure for Paleogeosciences: Computing with Geologic Time, NSF, Boulder, CO, October, 2014.

SCAMP Undergraduate Research Banquet, South Carolina Alliance for Minority Participation (SCAMP), Charleston, SC, October 1, 2014.

EarthCube All Hands Meeting (NSF), EarthCube.org, Washington, DC., June, 2014.

Interdisciplinary Earth Data Alliance (IEDA) Policy and User Committee Meeting, NSF, NYC, NY, June 3-4, 2014.

Workshop for Enhancing GeoMapApp and exploring other options for visualization and analysis tools for solid earth science research and education, IEDA, NSF, NYC, NY, June 1-3, 2014.

Invited Workshop, Panel, and Conference Participation (cont.)

The Summit on Information Technology, http://it-ology.org/, SC Dept. of Commerce and It-Ology, Columbia, SC, April 23, 2014.

EarthCube Portfolio Workshop, NSF, Boulder, CO, February 11-14, 2014.

Convocation Conversations with Faculty Training. Provost, College of Charleston. Charleston, SC. August, 2013.

Palmetto Open Source Conference (POSSCON). It-Ology. Columbia, SC. April, 2013.

Cyber Infrastructure Research and Development Lab for the Earth Sciences. Data Processing Workshop. CIRDLES.org and EARTH-TIME.org, Cambridge, MA. December 2012.

EarthCube PI Workshop II. NSF, Boulder, CO. October, 2012.

Convocation Conversations with Faculty Training. Provost, College of Charleston. Charleston, SC. August, 2012.

Multicultural Student Programs & Services: Mentoring Matters Training. College of Charleston, Charleston, South Carolina. July 2012.

EarthCube Charette Number 2. National Science Foundation, Washington, DC. June, 2012.

Palmetto Open Source Conference (POSSCON). It-Ology. Columbia, SC. March, 2012.

CIRDLES Data Processing Workshop. CIRDLES.org and EARTH-TIME.org, Cambridge, MA. January, 2012.

Reviewing Progress for Exxon Mobil Upstream Research Corp. Upstream Research Corp, Houston, TX. December, 2011.

EarthCube Charette. National Science Foundation, Washington, DC. November, 2011.

Convocation Conversations with Faculty Training. Provost, College of Charleston. Charleston, SC. August, 2011.

Invited Workshop, Panel, and Conference Participation (cont.)

University of Arizona Laserchron Lab Workshop. National Science Foundation, Tucson, AZ. March, 2011.

Palmetto Open Source Conference (POSSCON). It-Ology. Columbia, SC. March, 2011.

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

Palmetto Open Source Conference (POSSCON). It-Ology. Columbia, SC. April, 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

11th INFORMS Computing Society Conference, Charleston, SC., January 2009.

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

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

Conference Sessions Convened

Bowring, James F., McLean, Noah, Zeringue, John, "TOWNHALL: Crowdsourcing the Next Generation of Isoplot," American Geophysical Union Fall 2014 Meeting, San Francisco CA, December 2014.

Bowring, J. (Chair), "Session on Nanoscience/Math/Computer Science/Astronomy", South Carolina Academy of Science Annual Meeting, Charleston, SC. April 17, 2010.

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.

Proceedings Edited

Bowring, J.F., Horstwood, M., Gehrels, G., "Proceedings of Handling, Processing, and Archiving of LA-ICP-MS U-Th-Pb Data: Statistical Interpretation of Age Information", College of Charleston, Charleston, SC, March 6-8, 2013.

Bowring, J. and Mazzone, M., editors, "Proceedings of Visual and Computational Teaching and Learning: a conference for college educators", Charleston, SC, November 2007.

Research Poster Presentations

*Zeringue, J. and Bowring, J. F., "Building Interactive Visualizations for Geochronological Data", American Geophysical Union, Fall Meeting 2014, abstract #IN41A-3639.

*Nettles, J. and Bowring, J. F., "CHRONI - an Android Application for Geochronologists to Access Archived Sample Analyses from the NSF-Funded Geochron.org Data Repository", American Geophysical Union, Fall Meeting 2014, abstract #IN41A-3640.

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.

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

Research / Development Collaborative Meetings

Refining the Mathematics of Uncertainty Propagation. British Geological Survey, Nottingham, UK. January 2013.

Encoding of LA-ICP MS workflow as performed at Arizona LaserChron Center, University of Arizona. George Gehrels, Director. January 2010.

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

Conferences Organized

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

2013 – Journal of Information and Software Technology: 2 manuscripts
2012 – Journal of Information and Software Technology: 3 manuscripts
2011 – Journal of Information and Software Technology: 3 manuscripts
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 Awarded (* denotes student)

2015: Bowring, James F., PI, *Nettles, Joye (Co-Investigator), "CHRONI- An Android Application for geochronologists to access archived sample analyses from the NSF-funded GeoChron.org data repository", Sponsored by MAYS, College of Charleston, $750, January - May.

Research Grants Awarded (* denotes student) (cont.)

2014 - 2017: Bowring, J., PI, "CIF21 DIBBs: Collaborative Research: Cyberinfrastructure for Interpreting and Archiving U-series Geochronologic Data", NSF Award #1443037, $579,763.

2014: Bowring, James F., PI, *Zeringue, John (Co-Investigator), "Engineering an Open Source Visualization Engine for the Earth Sciences", Sponsored by MAYS, College of Charleston, $2,000, October - June.

2013 - 2016: Bowring, J., PI, "Collaborative Research: Analytical Techniques and Software: Development of CyberInfrastructure to Support Laser-Ablation ICP Mass Spectrometry", NSF Subaward #1442036 to NSF Award #0930223, $31,894.

2013 - 2016: Bowring, J., PI, "EarthCube Test Enterprise Governance: An Agile Approach", NSF Subaward of NSF Award #1340233, $70,000.

2013 – 2015: Bowring, J., Co-PI, "EC3 - Earth-Centered Communication for Cyberinfrastructure: Challenges of field data collection, management, and integration", NSF Award #1340265, $299,329.

2013 - 2014: Bowring, James F., PI, *Zeringue, John (Co-Investigator), "Engineering an Open Source Visualization Engine for the Earth Sciences", Sponsored by SURF, College of Charleston, $3,500, May - August.

2012 - 2013: Bowring, J., PI, "Community Engagement to Inform EarthCube Governance", Sponsored by Arizona Geological Survey, NSF Subaward #1256235, $10,000.

2010 - 2013: Bowring, J., PI, "Collaborative Research: Analytical Techniques and Software: Development of CyberInfrastructure to Support Laser-Ablation ICP Mass Spectrometry", NSF Award #0930223, $321,911.

2012 - 2013: Bowring, J., PI, "Support for the Detrital Zircon Geochronology Database III.", Upstream Research Company, $35,000.

2011 - 2012: Bowring, J., PI, "Support for the Detrital Zircon Geochronology Database II.", Upstream Research Company, $35,000.

2010 - 2011: Bowring, J., PI, "Support for the Detrital Zircon Geochronology Database I.", Upstream Research Company, $35,000.

Research Grants Awarded (* denotes student) (cont.)

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

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

Research Grants Submitted

2015: Bowring, James F., PI, "CAREER: Collaborative Development of Domain-Specific Cyberinfrastructure Ecosystems using Scientific Method Based Continuous Improvement: AdvancingScience and Education", NSF, $676,995, 2016 – 2021.

Steering Committee Appointments to Research Grants

2015– 2017: "EarthCube RCN: iSamples: The Internet of Samples in the Earth Sciences", NSF Award #1440351.

2013 – 2015: "EarthCube RCN: EC3 - Earth-Centered Communication for Cyberinfrastructure: Challenges of field data collection, management, and integration", NSF Award #1340265.

Awards

College of Charleston:
C. Richard Crosby Distinguished Teaching Co-Chair (2015-2017)

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 on College of Charleston Campus, 1999

Professional Affiliations

Association for Computing Machinery (ACM)
IEEE Computer Society
American Geophysical Union (AGU)
Council on Undergraduate Research (CUR)

Service Activities

Department of Computer Science (see also Mentoring activity above)

2015: Hosted the Association for Computing Machinery's SouthEast Region International Collegiate Programming Competition.

2014-2015: Charleston Start-Up Weekend representative, sending 45 students per year.

2013: Coach and chaperone student team to Palmetto Cyber Defense Competition.

2010-2015: Coordinate student trip to Palmetto Open Source Software Conference, Columbia, SC, except 2014.

2010-2013: CS Dept. curriculum committee chair.

2009-2012: CS Dept. committee to design, implement, evaluate a 21st century classroom.

2009-2010: CS Dept. committee for internships/mentoring programs with industrial partners.

2009: CS Dept. hiring committee for a department administrator.

2009: CS Dept. committee to develop Service-Oriented Computing certificate program.

2008-2015: Coordinator of CS Annual Alumni Symposium.

2008-2013: Space Planning Committee member.

2008-2012: Organize the annual Spring CS Alumni Reunion Events.

2008: CS Dept. committee to develop a new Business Informatics degree.

Service Activities (cont.)

Department of Computer Science (cont.)

2008: Organize and host the Employer Meet and Greet for CS students.

2007: Coordinate student trip to US Dept. of Energy Day of Science, Knoxville, TN.

2006 – 2013: Faculty advisor to ACM student chapter (2006 - 2010), College of Charleston, Produce and host annual High School Programming Competitions (2006 – 2010); Organize student teams to attend ACM International Collegiate Programming Competition.

2006-2009: Faculty coordinator for Computing Outreach Lecture Series.

1999-2000: President ACM student chapter, College of Charleston.

College of Charleston (see also Mentoring activity above)

2015: Joined CofC IT Strategic Advisory Committee (July)

2013: SCAMP Presentations Banquet Judge.

2013: Panelist for SSM in the Computer Science Focus Group for the CofC Capstone of Strategic Communication.

2012-2015: Chair, Faculty Committee on Academic Services.

2012-2015: CofC Mentoring Matters trained mentor of 1 student per year.

2012-2014: Panelist, SSM Match-Making Session.

2012-2014: Panelist, Honors College Research Roundtable.

2012: Member, Faculty Committee on Academic Services (half-year).

2011-2015: SCAMP Advisory Board.

2012-2014: SSM Poster Session mentor to presenting students.

2012: Provost Office and ORGA Conference Panel Member, “Maximizing external funding while minimizing administrative headaches”.

Service Activities (cont.)

College of Charleston (see also Mentoring activity above)(cont)

2011- 2104: Convocation Facilitator.

2009-2015: Provide mentoring support to four SCAMP students.

2007, 2009: Participant in Learning Community/FYE initiative, College of Charleston.

Professional Community (see also Steering Committee appointments above)

2012-2016: Advisory Panel of NSF's EarthCube Test Governance Operations Management Group.

2012-2014: Chair, NSF's EarthCube Special Interest Group for a Software Engineering Community of Practice.

2015: Judge for Lowcountry Regional Science and Engineering Fair, Charleston, SC.

2012: Judge for Palmetto Pillar Awards, It-Ology, Columbia, SC.

2010-2015: Volunteer for Teaching Open Source, www.teachingopensource.org.

2010: Volunteer for Lowcountry Computer Science Camp by CS and SC Computing Consortium.

2007-2010: Judge for Lowcountry Regional Science and Engineering Fair, Charleston, SC.

2004: Participated in writing successful NSF application for Highly Dependable Computing and Communication Systems Research, Georgia Tech.

Community

2008-2009: Volunteer at SEWEE Visitor and Environmental Center.

203-2004: Atlanta Mayor's Office of Community Technology, Volunteer.

2000-2001: Mount Pleasant, SC, Commercial Development Design Review Board.

Service Activities (cont.)

Community (cont)

1995-1996: Board Member, Moultrie Middle School PTA, Mount Pleasant, SC.

1991-1992: Membership Chair, Charleston Chapter, Construction Specifications Institute.

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