

# John J. Barton

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## SENIOR SYSTEMS DESIGNER AND RESEARCHER

**Creative constructor:** imagines the future, builds new systems, explores new applications.

**Manager:** Java Tools group, IBM Watson Research Center.

**Author:** over 60 papers, 5 patents, co-author of "Scientific and Engineering C++" book.

**Practical visionary:** contributions to products, standards, and open source.

**Breadth:** mobile web computing, Java virtual machines, compilers, C++ language, physics.

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HP Labs, Palo Alto CA

1998 – 2004

### Senior Researcher, Future Mobile and Ubiquitous Computing.

**"MeetingMachine":** Networked, digital projector system for meetings, supporting the exchange, discussion, and collation of electronic documents from laptops, memory sticks and RFID tags. Mobility across domains of fixed digital appliances. Integrated experimental systems from HP and Stanford with WebDAV and new code to create a one-click client/server. 22 interim releases; With Prof. A. Fox and members of his group. (pub #67, 68; patent #5, source in sourceforge (iros project) )

**"Ubiwise":** A simulator for ubiquitous computing systems design. Design, development and testing of services for multiple heterogeneous devices, multiple people, with dependence on location or other variables. A flexible Java framework for device user-interface inputs connected to a 3D visualizer (Quake III) for location dependence and multiple device interaction. With V. Vijayaraghavan, MS Stanford. (pub #66; Source on <http://handhelds.org>.)

**Web-based Nomadic Computing,** Explored ubiquitous mobility support for users in unfamiliar environments. How to leverage web ubiquity and architectural principles (pub #57); Simple configuration of heterogeneous digital appliances via "physical registration" (pub #60 and patent #4); how to add sensors to mobile web clients in a web-consistent way (pub #65). This work was part of HP's Cooltown project. With Tim Kindberg.

**Digital Appliance Services** Design principles and exploratory systems providing Internet services to digital cameras, printers, and other appliances. With Prof. A. Fox, B. Ling and A. Huang. (pub #61 and #55)

**"SOAP Messages with Attachments."** A W3C "Note", this specification became the de facto standard for combining XML and binary. Architecturally my focus was on insuring that digital appliance-like devices would be able to be first class clients or servers even with limited resources. With Satish Thatte and Henrik Frystyk Nielsen, both at Microsoft (pub #56)

### Editor:

Mobile Computation and Communication Review, Special Issue on Middleware for Mobility. With G. Banavar (IBM Watson), N. Davies (Univ. Ariz. and Lancaster Univ), and K. Raatikainen (Nokia).

Journal of Software and Systems 69(3): 207 (2004): Special Issue on Development Tools for Ubiquitous Computing. With R. Cerqueira (Univ. Illinois) and M. Fortuna (IBM).

### Workshop Organizer:

"Spontaneous Interaction", UbiComp 2002, Gotenberg Sweden.

"Ubitools", UbiComp 2001, Atlanta GA, USA.

**Invited Lecturer:** Dagstuhl UbiComp Summer School, Dagstuhl, Germany, Aug. 2002.

**Finance Chair:** IEEE WMCSA 2002, Callicoon NY.

### Recent Conference Program Committees:

Program Committee Ubicomp 2003  
Technical Program Committee ICC 2003,  
Symposium on Personal Communication Systems and Wireless LANs  
Technical Notes Program Committee, Ubicomp 2002.  
IEEE Internet Computing magazine special issue on Web Services.  
WWW2003 Web Services Program Committee  
National Science Foundation Network Research Proposals, Nov. 7-8 2002.

IBM T.J. Watson Research Center, Hawthorne, NY

1996-1998

### Research Manager, Java Virtual Machines.

**Managed** 12 researchers, brought in 5 new hires. Technical due diligence for IBM's acquisition of Edmark; Technical evaluation of JVM startup for IBM (they became Hotspot JVM team at Sun).

**Team Organizer:** Brought a compiler team together with a systems team to create a major project to explore dynamic compilation in Java. The basis for IBM's Jikes Research Virtual Machine, <http://www-124.ibm.com/developerworks/oss/jikesrvml/>

**"Jalapeno Java Virtual Machine"** Wrote the bootloader for our JVM. The virtual machine was written in Java, so the boot loader was written in Java but operated on a "real" machine. (pub #51-54)

IBM T.J. Watson Research Center, Hawthorne, NY

1993-1996

### Researcher: Incremental C++ Compiler

**"Montana":** Distributed "cfront", the first C++ compiler through out IBM at a time when PL/1 was the only official language. With Lee Nackman, Michael Karasick and Derek Lieber conceived of a C++ program database and an engine to load and unload it incrementally. Built part of the dependency analysis system, a mechanism to trigger external tools (plugins), and an HTTP server allowing Web browsers to be C++ browsers. Montana shipped as a major IBM product, VisualAge for C++, v 4.0. (patents 2-4)

**Architecture Team Member:** IBM VisualAge for C++ 4.0, a new, incremental C++ development environment from IBM.

**Author:** Book "Scientific and Engineering C++: An Introduction with Advanced Techniques and Examples" with Lee R. Nackman, Addison-Wesley, 1994, 671pgs. Explored advanced C++ and object- oriented programming techniques for scientific and engineering problems. (pub #41) Source code at <http://www.nackman.com/SciEng/index.html>

**Columnist:** In the C++ Report, the premier professional magazine for C++ programmers, with Lee R. Nackman. (pub #42-49)

IBM T. J. Watson Research Center. Yorktown Heights, NY

1987-1993

### Researcher: Photoelectron Holography

**Theoretical physics:** photoelectron holography for surface crystallography. (pub #25-35)

**Experimental chemistry:** surface structure using synchrotron (pub #20-23)

## Education

UC Berkeley: Postdoctoral Fellow.

*Theory of Medium Energy Electron Scattering* (with M. A. Van Hove).

UC Berkeley: Ph. D, Chemistry.

*Angle Resolved Photoemission Extended Fine Structure*; a new method to determine surface structure.

California Institute of Technology: MS Applied Physics

*Reconstruction and Oxidation of GaAs(110) Surfaces*; applied quantum chemistry surfaces.

California Institute of Technology: BS Chemistry.

## Patents of John J. Barton.

5. "A Sensor-enhanced Document Exchange and Display Control Device", John J. Barton, HP, (Application Filed Feb. 25, 2004)
4. US20020184332: "Physical registration method and system for resources" Kindberg, Timothy Paul James ; Barton, John Joseph (application filed May 2001)
3. US6219834: "Extensible compiler and method" Danny Soroker, Michael Karasick, John J. Barton, and David Streeter, IBM Corporation, April 2001.
2. US6182281: "Incremental Compilation of C++ Programs", David Streeter, John J. Barton, Michael Karasick, Lee R. Nackman, and Derek Lieber. IBM Corporation, Issued Jan. 30, 2001.
1. US5864700: "Sequencing and error detection of template instantiations during compilation of C++ Programs" John J. Barton, Michael Karasick, David Streeter, IBM Corporation. Issued Jan. 26, 1999.

## Publications of John J. Barton.

- 69 "Software Upgrade in Ubiquitous Computing", John J. Barton. Accepted for the proceedings of Pervasive 2004, Vienna Austria April, 2004.
- 68 "Guest editorial: Ubiquitous computing." John J. Barton, Renato Cerqueira, Marcus Fontoura: Journal of Systems and Software 69(3): 207 (2004)
- 67 "The MeetingMachine: How Nomads Can Meet In Interactive Spaces." John J. Barton, HP Labs Palo Alto, CA, Tony Hsieh, Vikram Vijayaraghavan, Tomoto Shimizu, Brad Johanson, and Armando Fox, Stanford University. Proceedings of 5th IEEE Workshop on Mobile Computing Systems & Applications (WMCSA 2003) October 9-10, 2003 Monterey, California, USA
- 66 "UBIWISE, A Simulator for Ubiquitous Computing Systems Design" John J. Barton, and Vikram Vijayaraghavan, HPL report: <http://lib.hpl.hp.com/techpubs/2003/HPL-2003-93.html>
- 65 "Sensor-enhanced Mobile Web Clients: an XForms Approach" John Barton Tim Kindberg Hui Dai Nissanka B. Priyantha Fahd Al-bin-ali, Proc. 2003 World Wide Web Conference, Budapest Hungary.
- 64 "Creating and Experiencing Ubimedia" John J. Barton, Patrick Goddi, and Mirjana Spasojevic. HP Technical Report HPL-2003-38 <http://lib.hpl.hp.com/techpubs/2003/HPL-2003-38.html>
- 63 "WISE - A Simulator Toolkit for Ubiquitous Computing Scenarios" John Barton and Vikram Vijayaraghavan. UbiTools-'01 workshop, UbiComp 2001.
- 62 "People, Places, Things: Web Presence for the Real World" Tim Kindberg, John Barton, Jeff Morgan, Gene Becker, Debbie Caswell, Philippe Debaty, Gita Gopal, Marcos Frid, Venky Krishnan, Howard Morris, John Schettino, Bill Serra, Mirjana Spasojevic. Proceedings of the 3rd IEEE Workshop on Mobile Computing Systems and Applications.
- 61 "Making Computers Disapper: Appliance Data Services" Andrew C. Huang, Benjamin C. Ling, John J. Barton, Armando Fox, ACM SIGMOBILE Seventh Annual International Conference on Mobile Computing and Networking (Mobicom) 2001, Rome Italy.
- 60 Physical Registration: Configuring Electronic Directories using Handheld Devices.. IEEE Personal Communications Special Issue Shreyas Sadalgi, Tim Kindberg, and John Barton.
- 59 The Cooltown User Experience John J. Barton and Tim Kindberg. CHI 2001 Workshop: Building the Ubiquitous Computing User Experience. HP Laboratories Technical Report HPL-2001-22
- 58 The Challenges and Opportunities of Integrating the Physical World and Networked Systems. Barton, John; Kindberg, Tim HP Laboratories Technical report HPL-2001-18.
- 57 "A Web-Based Nomadic Computing System." Tim Kindberg and John Barton. Computer Networks, Elsevier, vol 35, no. 4, March 2001, pp. 443-456.
- 56 "[SOAP Messages with Attachments](#)" John J. Barton, Hewlett Packard Labs, Satish Thatte, Microsoft, Henrik Frystyk Nielsen, Microsoft. W3C Note 11 December 2000, <http://www.w3.org/TR/SOAP-attachments>
- 55 "Running the Web Backwards: Appliance Data Services" Andrew C. Huang, Benjamin C. Ling, John J. Barton, and Armando Fox, Proceedings of the 9th International World Wide Web Conference, May 2000, pg 619.
- 54 "Debugging by Remote Reflection", Ton Ngo and John J. Barton, Proceedings Euro-Par 2000, Munich, Germany, August 27 2000, Lecture Notes in Computer Science v. 1900, pg 1031.
- 53 "The Jalapeno Virtual Machine." Bowen Alpern, Dick Attanasio, John Barton, Michael Burke, Perry Cheng, Jong-Deok Choi, Anthony Cocchi, Stephen Fink, David Grove, Michael Hind, Susan Flynn Hummel, Derek Lieber, Vassily Litvinov, Ton Ngo, Mark Mergen, Vivek Sankar, Mauricio Serrano, Janice Shepherd, Stephen Smith, V. C. Sreedhar, Harini Srinivasan and John Whaley. IBM Systems Journal, Java Performance Issue, Vol. 39, No. 1, 2000.
- 52 "Implementing Jalapeno in Java" Bowen Alpern, C. Richard Attanasio, John J. Barton, Anthony Cocchi, Susan Flynn Hummel, Derek Lieber, Ton Ngo, Mark F. Mergen, Janice C. Sheperd, Stephen Smith, Proceedings, ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications, (OOPSLA) Denver, CO (November 15, 1999), 1999: 314-324

- 51 "A Real-Time Performance Profiler for Java", John Whaley and John J. Barton, "Dr. Dobbs Journal", v 23, March 1998, p44.
- 50 "Extension Mechanisms in Montana", D. Soroker, M. Karasick, J. Barton and D. Streeter, Proc. 8th IEEE Israeli Conference on Computer Systems and Software Engineering, Herzliya, Israel, pp. 119-128 (June 1997).
- 49 John J. Barton and Lee R. Nackman C++ Report, v 9, Feb. 1997, p62 "Scientific and Engineering C++: Generating and Transforming".
- 48 John J. Barton and Lee R. Nackman C++ Report, v 9, Oct. 1996, p66 "Scientific and Engineering C++: Is this Standard Input?"
- 47 John J. Barton and Lee R. Nackman C++ Report v. 8 Jun. 1996, p77 "Scientific and Engineering C++: While (converting to C++) Use Iterators"
- 46 John J. Barton and Lee R. Nackman, "Scientific and Engineering C++: Hello ANSI/ISO!", C++ Report, v 8, no. 4, pg 68, Apr. 1996
- 45 John J. Barton and Lee R. Nackman C++ Report v. 8 Feb. 1996, p61 "Scientific and Engineering C++: Automatic Differentiation"
- 44 John J. Barton and Lee R. Nackman. "Advanced C++ with Applications From Science and Engineering" Proceedings of OOP '96 Conference, Munich Germany, Feb. 1996.
- 43 John J. Barton and Lee R. Nackman. "Scientific and Engineering C++: Dimensional Analysis." C++ Report, v.7 p.39, Jan. 1995.
- 42 John J. Barton and Lee R. Nackman. "Scientific and Engineering C++: Making concrete virtual with templates." C++ Report, pages 57-62, September 1994.
- 41 John J. Barton and Lee R. Nackman. Scientific and Engineering C++: An Introduction with Advanced Techniques and Examples. Addison-Wesley, Reading, MA, 1994. ISBN: 0-201-53393-6
- 40 John J. Barton and Lee R. Nackman. "Scientific and Engineering C++: Is const worth a thousand words?" C++ Report, pages 59-63, July 1994.
- 39 John J. Barton and Lee R. Nackman. "Scientific and Engineering C++: What's That Template Argument All About? C++ Report, pages 47-50, v. 56, May 1994.
- 38 Lee R. Nackman and John J. Barton. Base-class Composition with Multiple Derivation and Virtual Bases. In USENIX C++ Conference Proceedings. USENIX Association, April 1994.
- 37 John J. Barton and Lee R. Nackman. "Scientific and Engineering C++: Multidimensional arrays." C++ Report, pages 42-45, v. 47, November 1993.
- 36 John J. Barton and Lee R. Nackman. "Scientific and Engineering C++: Grafting onto our roots." C++ Report, pages 33-37, September 1993.
- 35 L. J. Terminello and J. J. Barton. Holographic imaging of atoms using multiple-wavenumber electron angular distribution patterns. Phys. Rev. Lett., 70:599-602, 1992.
- 34 J. J. Barton and L. J. Terminello. Source-wave angular momentum effects on electron diffracton patterns. Phys. Rev. B, 46:13548, 1992.
- 33 L. J. Terminello, J. J. Barton, and D. A. Lapiano- Smith. Near surface atom imaging using multiple energy photoelectron holography. J. Vac. Sci. Technol. B, v. 10, page 2088, 1992.
- 32 F. J. Himpsel, L. J. Terminello, D. A. Lapiano- Smith, E. A. Eklund, and J. J. Barton. Band dispersion of localized valence states in LiF(100). Phys. Rev. Letters, 68:3611-3614, 1992.
- 31 J. J. Barton. Removing multiple scattering and twin images from holographic images. Phys. Rev. Lett., 67:3106, 1991.
- 30 L. J. Terminello and J. J. Barton. Auger electron angular distributions from surfaces: Direct comparison with isoenergetic photoelectrons. Science, 251:1281, 1991.
- 29 J. J. Barton and L. J. Terminello. 3D images of surface structure from photoelectron holography. In S. Y. Tong, M. A. Van Hove, X. Xide, and K. Takayanagi, editors, Structure of Surfaces III, Milwaukee, WI, page 107. Springer-Verlag, 1991.
- 28 J. J. Barton. Photoelectron holography = holography + photoelectron diffraction. J. Electron Spectroscopy and Related Phenomena, 51:37, 1990.
- 27 M. L. Xu, J. J. Barton, and M. A. Van Hove. Electron scattering by atomic chains: Multiple-scattering effects. Phys. Rev. B, 23:8275, 1989.
- 26 J. J. Barton and F. J. Himpsel. Photoelectron spectroscopy. In M. Campagna and R. Rosei, editors, Photoemission and Absorption Spectroscopy of Solids and Interfaces with Synchrotron Radition, page 429. Proceedings of the International School of Physics ``Enrico Fermi'', North Holland, 1988.
- 25 J. J. Barton. Photoelectron holography. Phys. Rev. Lett., 61:1356, 1988.
- 24 J. J. Barton, M.-L. Xu, and M. A. Van Hove. Cluster multiple-scattering theory for medium-energy electron diffraction. Phys. Rev. B, 37:10475, 1988.
- 23 S. W. Robey, C. C. Bahr, Z. Hussain, J. J. Barton, K. T. Leung, Ji-ren Lou, A. E. Schach von Wittenau, and D. A. Shirley. Surface structure of (2x2)S/Ge(111) determined by angle-resolved photoemission fine structure. Phys. Rev. B, page 5657, 1987.
- 22 S. W. Robey, J. J. Barton, C. C. Bahr, G. Liu, and D. A. Shirley. Angle-resolved photoemission extended fine structure spectroscopy investigation of c(2x2)S/Ni(011). Phys. Rev. B, 35:1108, 1987.

- 21 C. C. Bahr, J. J. Barton, Z. Hussain, S. W. Robey, J. G. Tobin, and D. A. Shirley. Geometry of (2x2)S/Cu (001) determined with use of angle-resolved photoemission extended fine structure. *Phys. Rev. B*, page 3773, 1987.
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- 19 J. J. Barton, S. W. Robey, and D. A. Shirley. Theory of angle-resolved photoemission extended fine structure. *Phys. Rev. B*, 34:3807, 1986.
- 18 J. J. Barton, C. C. Bahr, S. W. Robey, Z. Hussain, E. Umbach, and D. A. Shirley. Adsorbate-geometry determination by measurement and analysis of angle resolved photoemission extended fine structure data: Application to c(2x2)S/Ni(001). *Phys. Rev. B*, 34:3807, 1986.
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- 16 J. J. Barton and D. A. Shirley. Small atom approximations for photoelectron scattering in the intermediate energy range. *Phys. Rev. B*, 32:1906, 1985.
- 15 J. J. Barton and D. A. Shirley. Curved-wave-front corrections for photoelectron scattering. *Phys. Rev. B*, 32:1892, 1985.
- 14 J. J. Barton, S. W. Robey, C. C. Bahr, and D. A. Shirley. Surface structure determination with ARPEFS. In M. A. Van Hove and S. Y. Tong, editors, *The Structure of Surfaces*, page 191. Springer-Verlag, 1985.
- 13 J. J. Barton and D. A. Shirley. Fourier analysis of extended fine structure with auto-regressive prediction. Technical Report LBL-14758, Lawrence Berkeley Laboratory, 1985.
- 12 J. J. Barton, C. C. Bahr, Z. Hussain, S. W. Robey, L. E. Klebanoff, and D. A. Shirley. Angle-resolved photoemission extended fine structure. In *Science With Soft-X-Rays*, v.447, page 82. SPIE, 1984.
- 11 G. Liu, J. J. Barton, C. C. Bahr, and D. A. Shirley. Calculation and computer simulation of the paraboloidal mirror analyzer (PMA). Technical Report LBL-18216, Lawrence Berkeley Laboratory, 1984.
- 10 J. J. Barton, C. C. Bahr, Z. Hussain, S.W. Robey, L. E. Klebanoff, and D. A. Shirley. Direct determination of surface structure from photoelectron diffraction. *J. Vac. Sci. Technol.*, 2A:847, 1984.
- 9 J. J. Barton, C. C. Bahr, Z. Hussain, S. W. Robey, J. G. Tobin, L. E. Klebanoff, and D. A. Shirley. Direct surface structure determination with photoelectron diffraction. *Phys. Rev. Lett.*, 51:272, 1983.
- 8 Z. Hussain, J. J. Barton, C. C. Bahr, E. Umbach, and D. A. Shirley. Monochromator crystals for synchrotron radiation use in the energy range 550- 5000ev. *Nucl. Instruments and Methods*, 208:333, 1983.
- 7 J. J. Barton, C. A. Swarts, and W. A. Goddard III. Core effective potentials for Ga, Ge, and As. *Phys. Rev. B*, 25:2812, 1982.
- 6 Z. Hussain, E Umbach, J. J. Barton, J. G. Tobin, and D. A. Shirley. Angle-resolved photoemission study of the valence bands of W(011) in the photon energy range 1100-1250ev: Observation of strong direct transitions and phonon effects. *Phys. Rev. B*, 25:672, 1982.
- 5 R. P. Vasquez, J. D. Klein, J. J. Barton, and F. J. Grunthner. Application of maximum entropy spectral estimation to deconvolution of XPS data. *J. Electron Spectroscopy and Related Phenom.*, 23:63, 1981.
- 4 C. A. Swarts, J. J. Barton, W. A. Goddard III, and T. C. McGill. Chemisorption of Al and Ga on the GaAs (110) surface. *J. Vac. Sci. Technol.*, 17:869, 1980.
- 3 J. J. Barton, C. A. Swarts, W. A. Goddard III, and T. C. McGill. Chemisorption of oxygen and aluminum on the GaAs(100) surface from ab initio theory. *J. Vac. Sci. Technol.*, 17:164, 1980.
- 2 John J. Barton, W. A. Goddard III, and T. C. McGill. Reconstruction and oxidation of the GaAs(110) surface. *J. Vac. Sci. Technol.*, 16:1178, 1979.
- 1 W. A. Goddard III, John J. Barton, Antonio Redondo, and T. C. McGill. Theoretical studies of Si and GaAs surfaces and initial steps in the oxidation. *J. Vac. Sci. Technol.*, 15:1274, 1978.