

ALLEN WIRFS-BROCK

Summary As a software architect and entrepreneur Allen Wirfs-Brock has made numerous contributions to the industrialization and commercialization of programming language technologies. He is an expert in dynamic object-oriented languages, their implementation, and their standardization. He has a broad experience base as an architect and implementer of compilers, virtual machines, programming environments, and computer systems. He is a proven strategic technologist, software architect, product developer, and manager who has founded two successful companies and made major contributions to both the Smalltalk and JavaScript language standards. In 2009 he was recognized by the ACM as an ACM Distinguished Engineer and in 2018 by Ecma International as an Ecma Fellow.

- 2015–present **WIRFS-BROCK ASSOCIATES** **SHERWOOD, OR**
Principal
- Consultant and advisor. independent researcher, writer/speaker, software historian.
- 2010–2015 **MOZILLA CORPORATION** **SHERWOOD, OR & MOUNTAIN VIEW, CA**
Research Fellow
- Mozilla’s lead representative to TC39, the Ecma International standards committee responsible for JavaScript standards. Project editor and lead author of ECMAScript 2015 Language Specification, the first major update to the JavaScript standard since 1999. Made significant contributions to the design of major new JavaScript. Worked with Ecma International management and member organizations to modernize its processes and IPR policies.
- 2003–2010 **MICROSOFT CORPORATION** **REDMOND, WA**
Principal Program Manager Architect, Developer Division
- JavaScript Language Architect, responsible for the Microsoft’s contributions to the evolution of the JavaScript language including proposing and reviewing new features for the language and representing Microsoft in the ECMAScript standardization process. Served as Project Editor for the ECMAScript 5th Edition Specification and designed the object reflection features introduced into ECMAScript 5.
 - Project leader and lead author of the first comprehensive specification of the Visual Basic for Applications programming language.
 - Architect for an experimental, next generation integrated programming environment.
- 1997–2003 **INSTANTIATIONS, INC.** **TUALATIN, OR**
Vice President, CTO, & Founder
- Architect of JOVE whole-program optimizing native code compiler and runtime system for Java.
 - Developed strategic technology partnerships with IBM and Rational relating to Eclipse IDE technologies.
- 1995–1997 **PARCPLACE-DIGITALK, INC.** **TUALATIN, OR & SUNNYVALE, CA**
Chief Scientist
- Led the technical effort to integrate the ParcPlace and Digitalk Smalltalk product lines. Directed advance technology development projects. Managed Oregon development site. Represented ParcPlace-Digitalk in the development of the ANSI Smalltalk standard.
- 1992–1995 **DIGITALK, INC.** **TUALATIN, OR & SANTA ANA, CA**
Vice-President-Technology
- As a member of the executive staff, guided the evolution of Digitalk’s Smalltalk products into an enterprise-class software development tool suite. Managed Oregon development site.
 - Architect of Team/V team— Digitalk’s collaborative IDE for Smalltalk

- Designed the Exception Handling System that was ultimately adopted for ANSI Smalltalk and all major commercial Smalltalk implementation.

1988–1992 **INSTANTIATIONS, INC.**

PORTLAND, OR

Vice-President of Engineering, and Founder

- Led contract research projects relating to persistent object-oriented systems for Apple Computer's Advanced Technology Group.
- Architect and led developer of an innovative team-oriented IDE product for Smalltalk programming. Company acquired by Digitalk, Inc.

1976–1988 **TEKTRONIX INC.**

BEAVERTON, OR

- Principal Engineer/ Chief Technologist, Tek Labs/Artificial Intelligence Machines Business Unit. Architect and lead implementer of industry's first high performance commercial Smalltalk products. System architect for the Tek 4404/4405/4406 AI workstation products.
- Senior Engineer/Principal Engineer, Tektronix Laboratories, Computer Research Lab. Developed unique virtual machine technology that, for the first time, enabled the Smalltalk-80 system to usefully execute on conventional microprocessors. Lead the adoption of Smalltalk as the primary software platform for a world-class lab of over 60 researchers resulting in many high impact advances in the object-oriented technology field.
- Software Engineer III/Project Leader, Graphics Computing Systems.
- Software Engineer II, Tektronix Laboratories, Computer Research Group
- Software Engineer, Logic Development Products

Major Projects and Products

JavaScript: the first 20 years. Lead coauthor with Brendan Eich. A 190 page monograph for the 2020 ACM History of Programming Languages Conference and published in the *Proceedings of the ACM on Programming Languages*. Written to be the definitive technical and social history of the creation, evolution, and standardization of the JavaScript programming language from 1995–2015. Created the Ecma ECMAScript 1996-2015 online archive (<https://ecma-international.org/archive/ecmascript/>) that makes publically available the primary source materials relating to JavaScript standardization during this period.

ECMAScript Language Specification 5th (2009) and 6th (2015) editions. Project editor and lead author for these major revisions of the ECMAScript (JavaScript) language standard. Made significant contributions to the design of many major new JavaScript features. Redesigned the algorithmic specification formalism.

Microsoft VBA Language Specification, 2008. Lead author and project leader for the first comprehensive language specification for the 15 year old Visual Basic for Applications language that is used for writing user macros and application extensions in Microsoft Office products. The specification is intended to enable the creation of interoperable implementation of the VBA language.

Instantiations *JOVE*, 1998-2003. Architect and development manager for commercial native code Java compiler incorporating aggressive whole program optimization techniques. JOVE enabled high performance Java application deployment without an accompanying virtual machine and included a unique garbage collector with thread local heaps.

ANSI Smalltalk Standard 1994-1998. Authored language definition chapters and several major class libraries sections. The ANSI Smalltalk language specification employees the declarative model of describing the Smalltalk language that I pioneered and incorporates the exception handling system that I designed for Digitalk Smalltalk

Declarative Smalltalk: Modular Smalltalk/Team V/Firewall/ANSI Smalltalk. 1987-1998. This was a related series of projects focusing on making Smalltalk robust and scalable for supporting large production

application development. The central idea is to define Smalltalk application using declarative “source files” rather than dynamically constructing them using reflection operations upon a virtual image. At an invited talk at OOSPLA’96 I demonstrate that both single purpose “exe-style” programs as well a complete Smalltalk-80 virtual image could be generated using these declarative techniques.

Digitalk Team/V. 1990-1997. A team-oriented IDE for Smalltalk that preserved the interactive/explorative feel of Smalltalk development while enabling conventional revision control systems to be used to manage the source code of large multi-programmer development projects. Team/V was one of the first IDEs to provide an extensible tool environment via an abstracted program data model and API. Team/V was a major subsystem of Digitalk’s Visual Smalltalk Enterprise, a commercially successful development environment used to development numerous mission critical enterprise applications. Lead architect and development manager.

Tektronix 4400 Series AI Workstations. 1984-1988. This was a family of “low cost” workstations specifically designed to support Smalltalk and other dynamic languages using conventional microprocessor and operating system technologies. The 4400 series workstations were the first polished, widely marketed, and reasonably affordable industrial products focused on supporting Smalltalk technology and as such they played a major role in introducing Smalltalk and dynamic object-oriented language technology to the computing industry. I originated the concept of the 4400 series. In addition to designing the Tektronix Smalltalk virtual machines as 4400 system architect I was responsible for the design of major system components such as the virtual memory system.

Tektronix 32-bit Smalltalk virtual machine, 1985-1986. This third generation Tektronix Smalltalk virtual machine for the Motorola 68020 was the first high performance commercial Smalltalk virtual machine to use direct 32-bit object references, a multigenerational garbage collector, and stack allocated activation records. I was architect of the virtual machine and implemented most of its major subsystems.

Tektronix Magnolia Smalltalk, 1982-1985. This second generation Tektronix Smalltalk implementation was the first to demonstrate that Smalltalk-80 could be practically implemented using conventional microprocessor technology. It also pioneered techniques for utilizing Smalltalk-80 in conjunction with the Unix operating system. It was widely adopted as the primary research language for the Magnolia workstation used by the Tektronix 60+ person Computer Research Lab and directly lead to the creation of the Tektronix 4400 series of workstation products as well as the use of Smalltalk as an embedded implementation language in several Tektronix oscilloscope products. I was the architect, primary implementer, and chief evangelist.

Tektronix Smalltalk-80 Evaluation 1980-1981. Xerox PARC collaborated with Tektronix and a small number of other companies to review draft Smalltalk books and to use to them as a guide for creating prototype implementations of Smalltalk-80 based computer system. I participated in the review and was one of the developers of the Tektronix implementation. This experience was reported in the book *Smalltalk-80: Bits of History, Words of Advice* to which I contributed a chapter. None of these implementation achieved usable performance levels but the experience inspired me to create the much more successful Magnolia Smalltalk virtual machine.

Tektronix 68000 Pascal Compiler. 1979-1980. I developed the backend and runtime system for a systems programming oriented Pascal compiler that was used as the implementation language for several major Tektronix products.

Publications

Allen Wirfs-Brock and Brendan Eich. 2020. JavaScript: the first 20 years. Proc. ACM Program. Lang. 4, HOPL, Article 77 (June 2020), 189 pages. DOI: <https://doi.org/10.1145/3386327>

The JSON Data Interchange Syntax, 2nd Edition, 2017, Ecma International Standard ECMA-404, Project Editor and lead author. <https://ecma-international.org/publications/files/ECMA-ST/ECMA-404.pdf>

Allen Wirfs-Brock. 2016. Programming Language Standardization: Patterns for Participation. 5th Asian Conference on Pattern Languages of Programs (AsianPLoP). AsianPLoP'2016, February 24-26. DOI: <https://zenodo.org/record/3710998>

ECMAScript 2015 Language Specification, 2015. Ecma International Standard ECMA-262. Project Editor and lead author. <https://ecma-international.org/publications/files/ECMA-ST-ARCH/ECMA-262%206th%20edition%20June%202015.pdf>

ECMAScript Language Specification, Edition 5.1, 2011. Ecma International Standard ECMA-262. Project Editor and lead author. <https://ecma-international.org/publications/files/ECMA-ST-ARCH/ECMA-262%205.1%20edition%20June%202011.pdf>

ECMAScript Language Specification, 5th Edition, 2009. Ecma International Standard ECMA-262. Project Editor and lead author. <https://ecma-international.org/publications/files/ECMA-ST-ARCH/ECMA-262%205th%20edition%20December%202009.pdf>

VBA Language Specification, Microsoft Inc. 2008. Lead author and project lead. [http://msdn.microsoft.com/en-us/library/dd361851\(PROT.10\).aspx](http://msdn.microsoft.com/en-us/library/dd361851(PROT.10).aspx)

“Complex Java Applications: Breaking the Speed Limit”, *Java Report*, 4(1) Jan. 1999. Reprinted in *More Java Gems*, Deugo, Dwight (ed.), 2000, Cambridge University Press.

“Programming in Smalltalk” in *The Handbook of Programming Languages, Volume I: Object-Oriented Programming Languages*, Peter H. Salus (ed.), 1998, Macmillan Technical Publishing.

American National Standard for Information Systems - Programming Languages - Smalltalk, 1998, National Committee for Information Technology Standards. Lead author for language definition and other major sections of the standards document.

Allen Wirfs-Brock, Harold Williams, Juanita Ewing, Brian Wilkerson, “A Declarative Model of Smalltalk Programs”, invited talk, OOPSLA'96.

Allen Wirfs-Brock and Brian Wilkerson, “Variables Limit Reusability”, in *Journal of Object-Oriented Programming*, 2 (1), May/June, 1989.

Allen Wirfs-Brock and Brian Wilkerson, “An Overview of Modular Smalltalk”, in *Proceedings of OOPSLA'88* .

Patrick J. Caudill and Allen Wirfs-Brock, “A Third Generation Smalltalk-80 Implementation”, in *Proceedings of OOPSLA'86*.

Mark B. Ballard, David Maier and Allen Wirfs-Brock, “QUICKTALK: A Smalltalk-80 Dialect for Defining Primitive Methods”, in *Proceedings of OOPSLA'86*.

Allen Wirfs-Brock, “Design Decisions for Smalltalk-80 Implementors” in *Smalltalk-80: Bits of History, Words of Advice*, Addison-Wesley, 1983.

Patents

U.S. Patent #4,720,703 *Display Method and Apparatus Employing Cursor Panning*, Charles B. Schnarel and Allen Wirfs-Brock.

U.S. Patent #7,743,076 *Extensible Action Sequences Coordinating Independently Developed Components*, Allen Wirfs-Brock and Dmiotry Goncharenko.

Professional Activities

Represented Microsoft (2007-20010) and Mozilla (2011-2015) on ECMA TC39, the ECMAScript (JavaScript) standards committee. Project editor ECMA-262, ECMAScript Language Specification 5th Edition (2009). Edition 5.1 (2011), Edition 6 (2015). Acting TC39 Chair 2016. Currently Emeritus Member of TC39.

Founding member of X3J20, the ANSI Smalltalk standards committee. Chair of the language definition subcommittee.

Co-convenor of ad hoc organizing committee for the first Conference on Object-Oriented Programming Systems, Languages, and Applications (OOPSLA’86)

Member of the Steering Committee, ACM Dynamic Language Symposium’05 (DLS’05)

Member of the Program Committee, OOSPLA’86, OOPSLA’87, OOPSLA’02, ECOOP’05, DLS’06, DLS’07, WASDeTT 2008.

Organizer OOSPLA’96 Extending Smalltalk Workshop

Speaker and panelist at numerous technical conferences, tradeshows, and user groups. Recent talks, presentations, and informal writings at www.wirfs-brock.com/allen

Education

1976	UNIVERSITY OF OREGON B.S. Computer Science	EUGENE, OREGON
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