

Mario Wolczko

Architect, Oracle Labs

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ACCOMPLISHMENTS

Contributed to/led the design and construction of: a variety of influential and widely deployed virtual machines; two hardware performance monitors; several hardware architectures for objects.

EXPERIENCE

2013–2022, Oracle Labs, Architect

Assisted with detailed planning for a [new server architecture](#) project (not funded). Taught full-semester graduate [course](#) on virtual machines at UC Berkeley by invitation. Worked on [trace sampling](#) for improved dynamic compilation. Led [academic collaboration](#) to introduce polyglot programming curriculum. Developed a [novel persistent programming model for Java](#) and [implementation](#) in GraalVM Native Image.

2010–13, Oracle Labs, Research Director

2006–2010, Sun Microsystems Laboratories, Research Director and Principal Engineer

(Sun was acquired by Oracle in 2010)

Managed/supervised/led ~20 research projects, ~50 research staff, in the areas of virtual machines, binary translation, processor design, static analysis, web programming, high-speed switching, management science, and security. Participated in VM and processor design technical work, also in the design and review of various facilities in SPARC processors.

2004–6, Sun Microsystems Laboratories, Distinguished Engineer

Principal Investigator. Led an investigation into hardware-assisted garbage collection. Lead architect for the performance monitoring subsystem of a SPARC microprocessor.

1993–2004, Sun Microsystems Laboratories, Senior Staff Engineer

Principal Investigator, 1999–2004. PI of a group investigating novel memory systems for object-based computation. Led Java VM research at Sun Labs (~10 projects over 5 years). Co-architected the performance monitoring subsystem of a SPARC microprocessor.

Manager, 1997–9. Managed a group working on the “Spotless” Java VM, the first JVM on Palm PDAs. I managed the transition from research to a product (becoming the J2ME “K” VM, ultimately deployed on >500M cellphones).

Project lead, 1996–7. On secondment to SunSoft, I led the development of the Solaris Production Release of the Java 2 JVM (1.2), aka “Exact VM”. This VM also formed the basis of Sun’s “C” VM (J2ME CDC) deployed in BluRay, Kindle, and elsewhere.

Researcher, 1993–6. Worked on the Self Virtual Machine and Programming Environment. I built a virtual machine for Smalltalk using the Self VM as substrate, and worked on a JVM built in the same manner. The Self VM formed the basis for the HotSpot JVM.

1987-1992 University of Manchester, Research Associate/Research Fellow/Lecturer

I was a principal investigator of a project developing a computer architecture for Smalltalk. I also taught intensive industrial courses on Smalltalk, Object-Oriented Design, and C programming.

EDUCATION

Ph.D. Computer Science, 1987, *Semantics of Object-Oriented Languages*, University of Manchester

M.Sc. Computer Science, 1984, *An implementation of Smalltalk-80 on the ICL Perq*, University of Manchester

B.Sc. (Hons) Computer Science, 1983, University of Manchester.

Inventor or joint inventor on 48 issued U.S. patents and a number of pending applications.

SELECTED RESEARCH PUBLICATIONS

Processor Tracing for Virtual Machines,

M. Wolczko and C. Kaynak, *MoreVMs '17*, Apr 2017

One VM to rule them all

T.Würthinger, C.Wimmer, A.Wöß, L.Stadler, G.Duboscq, C.Humer, G.Richards, D.Simon, M.Wolczko, *Onward!* (part of OOPSLA) 2013:187-204

Introspection of a Java Virtual Machine under Simulation

G. Wright, M.Wolczko, P. McGachey, E. Gunadi, Sun Labs Technical Report 2006-159, Sep 2006.

Writing Solaris Device Drivers in Java

H. Yamauchi and M. I. Wolczko, Sun Labs Technical Report 2006-156, Apr 2006.

An object-aware memory architecture

Greg Wright, Matthew L. Seidl, Mario Wolczko, Sun Labs Technical Report 2005-143, Feb 2005. Also in *Science of Computer Programming* 62(1), Oct 2006.

Heap Compression for Memory-Constrained Java Environments

G. Chen, M. Kandemir, N. Vijaykrishnan, M. J. Irwin, B. Mathiske, M. Wolczko, OOPSLA 2003.

Tracking Object Life Cycle for Leakage Energy Optimization

G. Chen, N. Vijaykrishnan, M. Kandemir, M. J. Irwin and M. Wolczko, Proc. ISSS/CODES joint conference, Oct 2003.

Java Microarchitectures

Vijaykrishnan Narayanan, Mario Wolczko (eds), Kluwer, 2002.

Tuning Garbage Collection for Reducing Memory System Energy in an Embedded Java Environment

G. Chen, R. Shetty, M. Kandemir, N. Vijaykrishnan, M. J. Irwin, M. Wolczko, *Trans. Embedded Computing Systems*, 1(1), Sep 2002.

Adaptive Garbage Collection for Battery Operated Environments

G. Chen, R. Shetty, M. Kandemir, N. Vijaykrishnan, M. J. Irwin, M. Wolczko, Proc. JVM'02.

Tuning Garbage Collection in an Embedded Java Environment

G. Chen, R. Shetty, M. Kandemir, N. Vijaykrishnan, M. J. Irwin, M. Wolczko, Proc HPCA 8.

Automated and Portable Native Code Isolation

G. Czajkowski, L. Daynes and M. Wolczko, Sun Labs TR-2001-96. Also in Proc. ISSRE 12.

Towards a Universal Implementation Substrate for Object-Oriented Languages

M. Wolczko, O. Agesen and D. Ungar, OOPSLA '99 workshop on Simplicity, Performance and Portability in Virtual Machine Design.

self includes: Smalltalk

Mario Wolczko, in "Prototype-Based Programming", Noble, Taivalsaari, Moore (eds), Springer, 1999.

Compiling Java, Just In Time

T. Cramer, R. Friedman, T. Miller, D. Seberger, R. Wilson, M. Wolczko, IEEE Micro, May/June 1997.

From Kansas to Oz: collaborative debugging when a shared world breaks

R. B. Smith, M. Wolczko and D. Ungar, CACM, April 1997.

MISCELLANEOUS

- ACM Distinguished Engineer
- Refereed for various publications and conferences, served on program committees (CGO, IVME, ECOOP, IC00OLPS), was Program Chair for IC00OLPS, and served on the steering committee for VEE.