

Résumé

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Summary

My career in Silicon Valley has been one great adventure, and I don't want it to stop!

I've earned a strong reputation for designing, developing, and deploying advanced pioneering software systems with high quality and extreme reliability while overcoming resource constraints. I've designed and built successful enterprise systems to manage and analyze scientific data.

My experience includes multiple roles at startups, public companies, and research agencies, including architect, developer, engineering manager, and marketing director. I'm an accomplished instructor and writer with strong communication and people skills. I can organize people to get things done and motivate a team to complete projects on time and under budget and yet provide the highest customer and stakeholder satisfaction.

As a Research Staff Member at the IBM Almaden Research Center, I'm designing and developing a platform for combining heterogeneous simulation models and datasets in order to solve complex multidisciplinary problems, such as obesity. As a Senior Scientist at the NASA Ames Research Center, I designed and led the development of information management software for the Mars Exploration Rovers mission. I was the Enterprise Software Strategist for the National Ignition Facility at the Lawrence Livermore National Laboratory, where I designed a data acquisition and scientific workflow system for a major laser-based fusion energy research project. Previously, I had major accomplishments at companies such as Metaphor, Sun Microsystems, Apple Computer, and Broadvision. I cofounded the software consulting company Willard & Lowe Systems, Inc. I've been an advisor and consultant to early-stage startups, such as the smart phone applications company Life360.

I strongly believe in contributing my experience and knowledge back to industry and to the community. I'm a highly rated instructor of upper division courses in the Department of Computer Science at San Jose State University, where I also run a speaker series and arrange collaborative projects between IBM and the university. I am a successful author of published books on software technology which have been translated into several languages.

I'm familiar with the Linux, Solaris, Windows, and Macintosh platforms. I program in Java and C++ and various scripting languages including Perl, Python, PHP, Bash, and Korn Shell. I teach and use popular open-source tools for software engineering. I'm experienced with the Kepler Scientific Workflow system. I'm always looking for new opportunities to research and develop leading-edge software products and technologies.

I attained a Level P Security Clearance at the Lawrence Livermore National Laboratory.

Industry and research experience

IBM Almaden Research Center, *Research Staff Member*, 2008-present.

My current project is to design and develop the Smarter Planet Platform for Analysis and Simulation of Health (SPLASH) that combines heterogeneous simulation models and datasets in order to solve complex multidisciplinary problems. I am the architect and lead developer for the critical infrastructure software: the SPLASH Actor Definition Language (SADL), parsers for SADL and XML Schema Definition (XSD), and extensions to the Kepler Scientific Workflow System. <http://www.almaden.ibm.com/asr/projects/splash/>

My previous project at IBM Almaden built an advanced high redundancy storage system for IBM's next supercomputer that will manage over 100,000 disk drives. I worked to improve the software engineering practices and to increase system reliability.

As the lead of the San Jose Center for Advanced Studies (CAS), I promote joint research and development projects between the local IBM centers and the local universities. I am the "IBMer on Campus" at San Jose State University where I also teach (see below under *University teaching experience: San Jose State University*). <https://www-927.ibm.com/ibm/cas/>

Lawrence Livermore National Laboratory (IAP Worldwide Services), *Enterprise Software Strategist*, 2006-2007

I designed a service-oriented architecture for the National Ignition Facility (NIF), which researches fusion energy using the world's largest laser system. The enterprise system performed management, provisioning, and analysis of data generated by the laser firings. I evaluated information integration technologies, and I worked with the project managers to successfully advocate rapid prototyping and early and frequent system integrations.

I implemented workflows to automate data analysis using the Business Process Execution Language and Oracle BPEL Process Manager. The workflows used web services to exchange data with a content management system and invoked external analysis routines written in IDL. This work advanced the development schedule for data analysis by approximately six months, thereby saving the project much time and money.

I attained a Level P Security Clearance to work on the NIF project.

Willard & Lowe Systems, Inc., *Cofounder and Chief Technical Officer*, 2006-2010.

I cofounded a consulting company with expertise in the scientific, medical, and financial domains that developed and deployed enterprise information management systems. We developed web-based healthcare and practice management applications for small medical offices, and we advised and provided consulting for early-stage startups.

NASA Ames Research Center (University of California at Santa Cruz), *Academic Appointment, Project Scientist*, 2004-2005.

NASA Ames Research Center (RIACS, Research Institute for Advanced Computer Science), *Senior Scientist*, 2002-2004.

I was the architect and lead developer of the middleware for the Collaborative Information Portal (CIP), an enterprise-class application used by NASA's Mars Exploration Rovers (MER) mission. MER was a highly successful \$800 million mission that landed two robotic geologists on Mars in January 2004. CIP exceeded its requirements and promoted situational

awareness and user collaboration. Mission control and mission scientists and researchers used it to access staff and event schedules, to obtain accurate times in various Earth and Mars time zones, and to view and download mission data, images, and reports securely over the Internet.

After over two years of operation, the CIP middleware achieved an uptime record of better than 99.9%. I accomplished this with a solid service-oriented architecture based on web services and J2EE technologies, strong project management skills, and a strict adherence to key software engineering principles for productivity and reliability. CIP was one of only two software projects for the mission that was completed on schedule.

I provided mission support at both the NASA Ames Research Center and the Jet Propulsion Laboratory. I wrote several papers about CIP that were published in major refereed journals, and I gave numerous presentations to industry and academia. I received important NASA awards, including the *Space Act Board Award* and the *Turning Goals Into Reality Administrator's Award*.

After MER, I designed and led the development of the Systems Health Information Portal (SHIP) for the International Space Station and other manned spacecraft to enable astronauts to quickly resolve life-threatening situations while in space and possibly out of contact with ground-based support. I built this information management system with dynamic web page generation, web services, J2EE components, and enterprise information integration technologies. SHIP accessed and transformed data from disparate sources into a knowledge base of fault analyses, prognostications, and corrective procedures.

I made full use of my industry contacts to organize my NASA colleagues, UC Santa Cruz faculty members, and senior officers from local companies to meet, write, and submit grant proposals for joint projects.

Knowledge Networks, *Senior Systems Architect*, 1999-2001.

I was the architect of an enterprise system that deployed web-based consumer and political opinion surveys, conducted the surveys, and analyzed the results. I designed and led the development of a web-based workflow manager for creating surveys and an XML-based survey authoring system. I evaluated data warehousing and data mining technologies.

Stellar Solutions, Inc., *Director of Marketing*, 1997-1998.

I performed market research, developed marketing collateral, and organized trade show participation for this vendor of web-based tools that managed the development of multimedia content. I established business partnerships with major multimedia vendors and providers and positioned the company within the multimedia industry as the enabler of the "virtual studio".

BroadVision, Inc., *Senior Staff Engineer and Project Lead*, 1995-1997.

As the architect and lead developer of the middleware for the company's primary product, I helped pioneer the use of server-side scripting and the generation of dynamic HTML pages. This enabled the company to become the leading supplier of web-based infrastructure software that created personalized one-to-one e-commerce applications.

Alltel Information Systems, *Consultant*, 1995.

I developed data access technologies for a distributed medical information system, which included writing compilers for proprietary versions of SQL and data definition languages. The information system became a highly successful product.

Apple Computer, Senior Engineer, 1993-1994.

As the senior designer of infrastructure software for the Apple Newton PDA applications, I designed and developed tools to create mathematical and financial applications that used handwriting recognition. At Apple Germany, I conducted user studies and helped to sell the German-language Newton to the Austrian school system.

Sun Microsystems, Inc., Software Engineering Manager and Project Lead, 1985-1992.

I was the highly rated manager of a 12-member engineering team that created an application development framework for a distributed windowing system. I was responsible for both project and personnel management. I was the architect and lead developer of a windowing system for Sun Common Lisp, when I worked with James Gosling on precursor technologies for the Java language. I received Sun's *Key Employee* award.

Metaphor Computer Systems, Senior Engineer and Project Lead, 1983-1985.

I was a principal developer of the desktop infrastructure and applications, which pioneered the use of screen icons within a graphical user interface on a commercial system. I integrated BASIC as an embedded computational language for the spreadsheet and as a scripting language to control workflow and data transfers between applications. I personally demonstrated these capabilities to Bill Gates of Microsoft several years before his company's introduction of Visual Basic for Applications.

Hewlett-Packard Company, Software Engineer and Project Lead, 1976-1983.

I implemented Pascal and FORTRAN compilers for minicomputers and workstations, and I developed an interactive report generator for a business computer system. I performed software quality assurance for business software packages.

University teaching experience

San José State University, Adjunct Professor of Computer Science, 2010-present.
Lecturer in Computer Science, 2008-2010

I teach very highly rated upper-division courses in software engineering and in compiler design. My primary mission is to give my students the benefits of my real-world experience and teach them the skills they need to succeed in industry. I work on major NSF grant applications on behalf of the university and serve as thesis advisor to graduate students. As the "IBMer on Campus," I promote joint research and development projects with faculty and IBM researchers (see above under *Industry and research experience: IBM Almaden Research*). <http://www.cs.sjsu.edu/~mak/>

I run the public *History of Computing Speaker Series* which presents talks by leading computing pioneers and industry luminaries. <http://www.cs.sjsu.edu/~mak/SpeakerSeries/>

Santa Clara University, Lecturer in Computer Science, 1978-1985.

I taught graduate courses on programming and on the theory and design of programming languages.

Stanford University, Lecturer in Computer Science, 1974-1975.

As a graduate student, I taught classes in FORTRAN scientific programming.

Publications and presentations

Books

- *Project-Oriented Software Engineering with Open-Source Tools*. Work in progress.
- *Writing Compilers and Interpreters, 3rd ed.: A Software Engineering Approach*. New York: Wiley, 2009. ISBN 978-0-470-17707-5. 840 pp.
- *Beautiful Code: Leading Programmers Explain How They Think*. Sebastopol, CA: O'Reilly, 2007. ISBN 0-596-51004-6. 595 pp. Contributed Chapter 20: "A Highly Reliable Enterprise System for NASA's Mars Rover Mission." 2008 *Jolt Award* winner. Translated into French and Japanese.
- *The Martian Principles for Successful Enterprise Systems: 20 Lessons Learned from NASA's Mars Exploration Rover Mission*. New York: Wiley, 2006. ISBN 0471789658. 138 pp. Translated into Chinese.
- *Java Number Cruncher: The Java Programmer's Guide to Numerical Computing*. New Jersey: Prentice Hall PTR, 2003. ISBN 0-13-046041-9. 464 pp. Translated into Chinese.
- *Writing Compilers and Interpreters, 2nd ed.: An Applied Approach Using C++*. New York: Wiley, 1996. ISBN 0-471-11353-0. 838 pp.
- *Writing Compilers and Interpreters: An Applied Approach*. New York: Wiley, 1991. ISBN 0-471-50968-X, 0-471-54712-3, 0-471-55580-0. 516 pp.

Recent refereed papers

- Tan, Wang-Chiew, Peter J. Haas, Ronald L. Mak, et al. "Splash: A Platform for Analysis and Simulation of Health." Submitted to the 2nd *ACM SIGHIT International Health Informatics Symposium*. Miami, FL, January 2012.
- Bigus, Joseph P., et al. "Information Technology for Healthcare Transformation." *IBM Journal of Research and Development*, September/October 2011, vol. 55, no. 5, pp. 6:1-6:14. <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6032766>
- Mak, Ronald, Joan Walton, et al. "A Reliable Service-Oriented Architecture for NASA's Mars Exploration Rover Mission." *IEEE Aerospace Conference*. Big Sky, MT, May 2005. Published in the conference CD-ROM. http://www.apropos-logic.com/IEEE_aerospace_article.pdf
- Mak, Ronald and Joan Walton. "The Collaborative Information Portal and NASA's Mars Rover Mission." *IEEE Internet Computing*, January/February 2005, vol. 9, no. 1, pp. 20-26. http://www.apropos-logic.com/IEEE_Internet_Computing_article.pdf
- Mak, Ronald, Elias Sinderson, and Vish Magapu. "Middleware and Web Services for the Collaborative Information Portal of NASA's Mars Exploration Rovers Mission." Invited paper. *ACM/IFIP/USENIX 5th International Middleware Conference*. Toronto, Canada, October 2004. Published in *Middleware 2004, Lecture Notes in Computer Science*, vol. 3231. Berlin: Springer Verlag, 2004. ISBN 3-540-23428-4. pp. 1-17.
- Walton, Joan D., Leslie E. Keely, and Ronald L. Mak. "Collaborative Information Portal: MER and Beyond." *First International Conference on Space Mission Challenges for Information Technology (SMC-IT)*. Pasadena, CA, July 2003. Published in the conference proceedings, JPL Publication 03-13A. pp. 327-334.

Selected presentations

- “SPLASH: How to Make Complex Decisions on those Really Hard Healthcare Problems.” *IBM Technical Leadership Exchange*. San Jose, CA, August 2011.
- “The Martian Principles for Successful Enterprise Systems.” *eBig.org Best Practices SIG*. Oakland, CA, March 2007.
- “Managing Scientific Data: Two NASA Case Studies.” Presented to the Lawrence Livermore National Laboratory. Livermore, CA, July 2006.
- “The Martian Principles for Successful Enterprise Systems: Lessons from Developing the Collaborative Information Portal for NASA’s Mars Rover Mission.” Presented to the IBM Almaden Research Center. San Jose, CA, November 2005.
- “How to Develop Reliable Mission-Critical Enterprise Software.” Lecture, graduate software engineering seminar, University of California at Santa Cruz. February 10, 2005.
- “NASA Ames Takes High Tech Computers to the Next Level.” *NASA Ames 65th anniversary celebration*. Moffett Field, CA, December 2004.
- “Java Technology, Web Services, and Mars: A NASA Trip Report.” (With co-presenters Joan Walton and Elias Sinderson.) *JavaOne 2004 Worldwide Java Developer Conference*. San Francisco, CA, June–July 2004.
- “Enterprise Development for Mars and Other Alien Places.” Keynote address, *BEA eWorld 2004 Conference*. San Francisco, CA, May 2004.
- “Mars Rover Information Portal.” Presented to the Stanford Networking Research Center. Stanford University, CA, May 2004.
- “NASA’s Collaborative Information Portal: HCI Lessons Learned.” (With co-presenters Joan Walton and Leslie Keely.) Presented to the Stanford University Program in Human–Computer Interaction. Stanford University, CA, February 2004.
- “BigInteger, BigDecimal, and a Billion Digits of Pi.” *JavaOne 2003 Worldwide Java Developer Conference*. San Francisco, CA, June 2003.
- “DARWIN, Web Services, and Mars.” (With co-presenters Joan Walton and Leslie Keely.) *JavaOne 2003 Worldwide Java Developer Conference*. San Francisco, CA, June 2003.

Awards

- *Jolt Award* for the book *Beautiful Code*, 2008.
- *NASA Space Act Board Award Certificate of Recognition, Collaborative Information Portal*, August 2004.
- *NASA 2004 Turning Goals Into Reality Administrator’s Award* “for valuable contributions to the Advanced Information Technology Infusion Team for the Mars Exploration Rovers 2003 Mission.” July 2004.
- *NASA Group Achievement Award, Mars Exploration Rover (MER) Information Technology Infusion Team*. May 2004.
- *NASA/Collaborative Information Portal. Certificate of Appreciation*. May 2004.
- *Universities Space Research Association (USRA)/Research Institute for Advanced Computer Science (RIACS). Performance Award* “for successful design, deployment, and utilization of CIP during the MER mission.” March 2004.
- *NASA Ames Research Center. Ames Honor Award*. “Code I MER Technology Infusion Team for Excellence in the Category of Group/Team.” September 2003.
- *Sun Microsystems, Inc. Key Employee*. 1991.
- *Stanford Computing Pioneer*. March 1987.

Education

Stanford University. M.S. in Computer Science/Computer Engineering, 1975.
B.S. *with distinction* in the Mathematical Sciences, 1975.

Management training courses at Hewlett-Packard and Sun Microsystems, 1976-1991.

Professional development courses

- “Relational Database Design” at U.C. Santa Cruz Extension, 2000.
- Seminar on information visualization taught by Prof. Edward R. Tufte, 1993.

Professional

Memberships

- Institute for Electrical and Electronics Engineers (IEEE)
- IEEE Computer Society
- Association for Computing Machinery (ACM)
- Text and Academic Authors Association
- Stanford Alumni Association

Leadership

- “IBMer on Campus,” San Jose State University, 2011-present.
- Lead, San Jose Center for Advanced Studies (an IBM University Relations program), 2010-present. <https://www-927.ibm.com/ibm/cas/>
- Group lead, software, 2004-present. IBM 1401 Restoration Project, Computer History Museum, Mountain View, CA.
- Chairman, Bay Area Chapter ACM, 1980.

Conference committees

- *International Symposium on Code Generation and Optimization*. San Jose, CA, March-April 2012. Registration Chair. www.cgo.org/cgo2012/
- *ACM Pacific '80 Conference*. San Francisco, CA, November 1980. Member of the organizing committee.

Credentials

Teaching credential, college level. Subject area: computer science.

Security clearance

Level P (high)