

Résumé

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Summary

I have a strong track record of building reliable software systems despite complexity and resource constraints. I continue to seek the principles that ensure success and I promote modern software engineering techniques to help programmers understand complex software.

I have very good communication and people skills. I know how to organize people to get things done, and as a project manager, I will motivate a team to complete projects on time and under budget and yet provide the highest reliability and customer satisfaction.

I have worked for a National Laboratory, NASA, startups, and public companies in multiple roles including software architect, developer, and project manager. I have expertise in enterprise systems, GUI- and web-based applications, web services, and data provisioning and management. I have experience with numerical computing, compiler writing, and general applications development in Java, C++, and C under Windows, Linux, and Solaris. I have taught graduate computer science courses, and I have written several highly rated books on computer software.

At the Lawrence Livermore National Laboratory, I helped design the architecture of an enterprise software system for data management, provisioning, and analysis. I implemented workflows for data analysis that advanced the development schedule by six months. At NASA, I designed and developed the Systems Health Information Portal for the International Space Station, an enterprise information management system that accesses and integrates data from disparate sources. I was the architect and lead developer of the middleware for the Collaborative Information Portal (CIP) used by scientists and researchers on the Mars Exploration Rover mission. CIP was one of only two software projects for the mission that were completed on schedule. After over two years of operation, this enterprise software system achieved an uptime record of better than 99.9%. I have received several key NASA and industry awards for excellence in software engineering and engineering management.

National Laboratory, NASA, and industry experience

IAP Worldwide Services, contracted to the **Lawrence Livermore National Laboratory**,
Enterprise software strategist, 2006-2007

I helped design the service-oriented architecture (SOA) of the enterprise software system for data management, provisioning, and analysis in the National Ignition Facility (NIF), which performs fusion energy research using the world's largest laser system. I evaluated enterprise information integration (EII) technologies. 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 (BPEL) and Oracle BPEL Process Manager. These workflows exchange data with a content management system (CMS) via web services and invoke external analysis routines written in IDL. This work advanced the development schedule for data analysis by approximately six months, thereby saving the project both time and money.

University of California at Santa Cruz, contracted to the **NASA Ames Research Center**, *Project Scientist*, 2004-2005.

Research Institute for Advanced Computer Science, contracted to the **NASA Ames Research Center**, *Senior Scientist*, 2002-2004.

I designed and developed the Systems Health Information Portal (SHIP) for vehicle health management on the International Space Station. I built this information management system with dynamic web page generation, web services, J2EE components, and enterprise information integration (EII) technologies. SHIP accesses and transforms data from disparate sources into useful integrated information, and ultimately into a knowledge base of fault analyses, prognostications, and corrective procedures. It will eventually be deployed on the new Crew Exploration Vehicle that will take astronauts back to the moon.

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 is a highly successful \$800 million mission that landed two robotic geologists on Mars in January 2004. CIP exceeds mission requirements, and mission control and mission scientists and researchers continue to use 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. CIP promotes situational awareness and user collaboration.

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 (SOA) 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 (JPL). I wrote several papers about CIP that were published in major refereed journals, and I gave numerous presentations to industry and academia. I have received important NASA awards, including the *Space Act Board Award* and the *Turning Goals Into Reality Administrator's Award*.

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

I held an academic position with the UC Santa Cruz and did research and development of information systems technologies on contract to the NASA Ames Research Center.

Customer Fidelity, *Founding Partner and Principal Developer*, 2001.

- Architect and developer of enterprise software that enabled businesses to use the web to build stronger relationships with their customers.
- Helped formulate the company's business model and overall product design.

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

- Architect for an enterprise system to deploy web-based consumer and political opinion surveys, conduct the surveys, and analyze the results.
- Architect and lead developer of a web-based workflow manager for creating surveys.
- Architect of an XML-based survey authoring system.
- Coordinated the evaluation of data warehousing and data mining technologies.

Caresoft, Inc., *Principal Software Engineer*, 1998.

- Architect and lead developer of an enterprise-class healthcare system that enabled medical personnel to use the web to communicate with patients during clinical trials.
- Collaborated with the medical staff to define requirements and specifications.

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

- 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.
- Established business partnerships with major multimedia vendors and providers.
- Successfully positioned the company within the multimedia industry as the enabler of the “virtual studio”.

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

- Architect and lead developer of the middleware for the company’s primary product.
- Pioneered the use of server-side scripting and the generation of dynamic HTML pages.
- 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.

- Developed data access technologies for a distributed medical information system.
- Wrote compilers for proprietary versions of SQL and data definition languages.
- Enabled the information system to become a highly successful product.

Telemark Productions, *Consultant*, 1994-present.

- Developed multimedia CD ROM products.
- Commercially successful product: *Telemark’s Guide to Dogs*, versions 1 and 2.

Apple Computer, *Senior Engineer*, 1993-1994.

- Senior designer of infrastructure software for the Apple Newton PDA applications.
- Architect and developer of a class library to create mathematical and financial applications that used handwriting recognition.
- Worked at Apple Germany to conduct user studies and to help sell the Newton to the Austrian school system.

Sun Microsystems, Inc., *Software Engineering Manager*, 1987-1992.

- Highly rated manager of a 12-member engineering team that created an application development framework for a distributed windowing system.
- Responsible for both project and personnel management.
- Received the Sun *Key Employee* award.

***Staff Engineer and Project Lead*, 1985-1987.**

- Architect and lead developer of a windowing system for Sun Common Lisp.
- Worked with James Gosling on precursor technologies for the Java language.

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

- Principal developer of the desktop infrastructure and applications, which pioneered the use of screen icons within a graphical user interface on a commercial system.
- Integrated BASIC as an embedded computational language for the spreadsheet and as a scripting language to control workflow and data transfers between applications.
- 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.

- Implemented Pascal and FORTRAN compilers for minicomputers and workstations.
- Developed an interactive report generator for a business computer system.
- Performed software quality assurance for business software packages.

University teaching experience

Santa Clara University, *Lecturer in Electrical Engineering and Computer Science (adjunct)*, 1978-1985. Graduate courses on software engineering and programming:

- Theory and Design of Programming Languages
- Programming Languages Seminar
- Programming in Pascal

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

- Scientific programming in FORTRAN

Publications and presentations

Books

- *Writing Compilers and Interpreters: A Modern Software Engineering Approach*. New York: Wiley, 2008. Work in progress.
- *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"
- *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.
- *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 as *Java Shu Zhi Fang Fa [Java Numerical Methods]*. Beijing: Publishing House of Electronics Industry, 2004. ISBN 7-5053-9309-X/TP. 428 pp.
- *Writing Compilers and Interpreters: 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.

Articles and refereed papers

- "A Reliable Service-Oriented Architecture for NASA's Mars Exploration Rover Mission." (With co-authors Joan Walton, Leslie Keely, Dennis Heher, and Louise Chan.) IEEE Aerospace Conference, Big Sky, MT, May 2005. Published in the conference CD-ROM. http://www.apropos-logic.com/IEEE_aerospace_article.pdf
- "The Collaborative Information Portal and NASA's Mars Rover Mission." (With co-author Joan Walton.) *IEEE Internet Computing*, January/February 2005, vol. 9, no. 1. pp. 20-26. http://www.apropos-logic.com/IEEE_Internet_Computing_article.pdf
- "Middleware and Web Services for the Collaborative Information Portal of NASA's Mars Exploration Rovers Mission." (With co-authors Elias Sinderson and Vish Magapu.) Invited paper. ACM/IFIP/USENIX 5th International Middleware Conference; Toronto, Canada; October 2004. Published in *Middleware 2004, Lecture Notes in Computer Science, vol. 3231*, Springer Verlag; Berlin, Germany; 2004. ISBN 3-540-23428-4. pp. 1-17.

- “Collaborative Information Portal: MER and Beyond.” (With co-authors Joan D. Walton and Leslie E. Keely.) 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.
- Revised and updated the main article “Computer.” *Compton's 2000 Encyclopedia*. Broderbund, 1999.
- “How to Create Bipolar CORBA Objects in Java.” *Java Report*, September 1999.
- “Uncommon Windows Development with Common Lisp.” White paper, Franz Inc, 1993.
- “Common Windows.” (With co-author Jim Veitch.) *SunTechnology*, Summer 1989.

Recent presentations

- “The Martian Principles for Successful Enterprise Systems.” Presented to the eBig.org Best Practices SIG. Oakland, CA, March 2007.
- “Managing Scientific Data: Two NASA Case Studies.” Presented to the Lawrence Livermore National Laboratory, 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, November 2005.
- “Enterprise Systems for Mars, the Space Station, and Other Interesting Places.” Presented to Sun Microsystems Laboratories, July 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.” Presented at the 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, 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.” 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.) 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, June 2003.
- “DARWIN, Web Services, and Mars.” (With co-presenters Joan Walton and Leslie Keely.) JavaOne 2003 Worldwide Java Developer Conference. San Francisco, June 2003.

Published interviews

- Heather Havenstein. “NASA Testing In-house System for Analyzing Space Station Health.” *ComputerWorld*, January 9, 2006. <http://www.computerworld.com/developmenttopics/development/story/0,10801,107556,00.html>
- Cliff Saran. “Java Drives Mars Mission Portal.” *ComputerWeekly.com*, March 2, 2004. <http://www.computerweekly.com/articles/article.asp?liArticleID=128706&liArticleTypeID=20&liCategoryID=1&liChannelID=9&liFlavourID=1&sSearch=&nPage=1>
- Karen A. Davis. “From Mars to Borland to you: Local company helps delve into Red Planet’s secrets.” *Santa Cruz Sentinel*, February 14, 2004. <http://www.santacruzsentinel.com/archive/2004/February/14/local/stories/01local.htm>
- Timothy Roberts. “BEA’s window on Red Planet.” *San Jose Business Journal*, January 30, 2004. <http://sanjose.bizjournals.com/sanjose/stories/2004/02/02/tidbits1.html>

Awards and patents

Awards

- NASA *Certificate of Recognition, The Collaborative Information Portal* (Space Act Board Award), 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.

Patents

- Co-applicant for two software patents for techniques to analyze the structure and content of web pages.

Education

Stanford University. M.S. in Computer Science/Computer Engineering, 1975.

Stanford University. 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).
- Association for Computing Machinery (ACM).

Leadership

- Group lead, software, 2004-present. IBM 1401 Restoration Project, Computer History Museum, Mountain View, CA.
- Chairman, Bay Area Chapter ACM, 1980. Organized and led chapter activities:
 - Monthly dinner meeting with industry speakers.
 - Monthly lecture series on upcoming computer technologies.
 - Professional development seminar on the Ada programming language.
 - Pacific '80 Conference, “Data Processing: New Directions for a New Decade.” San Francisco, November 1980.

Credentials

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