JAY REYNOLDS FREEMAN

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Summary:
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   I have 30 years' experience in software, and have spent most of my
   time dealing with research and development of low-level software
   for close-coupled massively parallel systems -- up to 250 000
   cores.  I have particular expertise in interprocessor communication
   and message routing in close-coupled parallel systems.  I am an
   experienced C++ and Lisp programmer.  I seek a job in which I can
   apply my skills and experience.

   Detailed resume follows.

Education:
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   B.S. (Physics) June 1968: California Institute of Technology, Pasadena,
        CA, with honor.
   M.A. (Physics) June 1969: University of California, Berkeley, CA.
   Ph.D. (Physics) June 1979: University of California, Berkeley, CA.
   B.S. (Marine Biology), December, 1996: San Jose State University,
        San Jose, CA.
   B.A. (Physical Anthropology), May, 2000: San Jose State University,
        San Jose, CA.
   Diverse classes at San Jose State University since 2000, notably in
        computer science, also in middle eastern studies, anthropology,
        and other subjects.

Fellowships, Awards, Honors:
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   Presidential Scholar, 1964.
   National Merit Scholar, 1964-1968.
   Tau Beta Pi member, elected 1967.
   National Science Foundation Graduate Fellowship, 1968-1970, 1972-1973.
   NASA Group Achievement Award, 1976.

Professional Societies and Activities:
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   American Astronomical Society.
   American Geophysical Union.
   Association for Computing Machinery.
   IEEE Computer Society.

Patents Granted:
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    U. S. Patent 7,224,689, May 29, 2007, "Method and apparatus for
    routing of messages in a cycle-based system". (I am the sole
    inventor.)

    U. S. Patent 7,478,119, January 13, 2009, "System and method for
    transposing memory patterns within the physical memory space". (I am
    one of five inventors.)

    U. S. Patent 7,516,361, April 7, 2009, "Method for automatic
    checkpoint of system and application software". (I am one of four
    inventors.)

    U. S. Patent 7,752,417, July 6, 2010, "Dynamic selection of memory
    virtualization technique". (I am one of five inventors.)

    U. S. Patent 7,797,329, September 14, 2010, "Method and system for
    enabling a synchronization-free and parallel commit phase". (I am
    one of six inventors.)

    U. S. Patent 7,822,941, October 26, 2010, "Function-based
    virtual-to-physical address translation". (I am one of five
    inventors.)

    U. S. Patent 7,823,141, October 26, 2010, "Using a concurrent partial
    inspector loop with speculative parallelism". (I am one of six
    inventors.)

    U. S. Patent 7,827,381, November 2, 2010, "Hybrid techniques for
    memory virtualization in a computer system". (I am one of five
    inventors.)

    U. S. Patent 7,917,710, March 29, 2011, "Memory protection in a
    computer system employing memory virtualization". (I am one of five
    inventors.)

Published Patent Applications:
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    No. 20070250604, October 25, 2007, "Proximity-based memory allocation
    in a distributed memory system". (I am one of several inventors.)

    No. 20080005526, January 3, 2008, "Local contiguous memory space

reservation and memory holes elimination". (I am one of several inventors.)

No. 20080034371, February 7. 2008, "Using police threads to detect dependence violations to reduce speculative parallelization overhead". (I am one of several inventors.)


References:
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    On request.


SUMMARY OF EMPLOYMENT AND PROFESSIONAL EXPERIENCE through July, 2012:
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Activity as Entrepreneur:
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    !987 -- 2012: Created and maintain several implementations of the Scheme programming language -- Wraith Scheme (open source, shareware, for the Apple Macintosh / MacOS 10), and Pixie Scheme III (open source, for sale in the App Store, for the Apple iPad / iOS).  Both are enhanced "R5" Schemes.  Wraith Scheme features parallel processing.

Employment:
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    September, 2008 -- December, 2009: Consultant to YOTERRA INC., a software startup developing proprietary Internet cataloging and marketing software.  Developed and tested algorithms, wrote several thousand lines of Java.

    15 September, 1997 -- 28 September, 2006: Staff Engineer, SUN MICROSYSTEMS, San Francisco Bay region, in Sun's research laboratory:

        2004 -- 2006: Design and development of software and architectural concepts for an advanced highly-parallel high-performance computer (DARPA-funded High-Productivity Computer System development project, Phase II).  Studied thread allocation mechanisms, memory architecture, and other proprietary topics.

        1999 -- 2003: Design, implement, test, debug, maintain and document the software system for static (compile-time) routing of messages in a proprietary multiple-instruction, multiple-data parallel-processing system encompassing up to 56000 individual

processors.  Developed significant new algorithms (US Patent
7,224,689) for this work.  Software comprised about 35000 lines
of C++.

2003: Design and implement new instruction-scheduling software
for the project mentioned in the paragraph above.  This software was
a redesign and reimplementation of the system originally developed,
slanted toward extendibility and maintainability.

1998 -- 1999: Developed a compiler component for a different
proprietary parallel processing system (multiple-instruction,
multiple-data, with up to about a dozen processors), which
disassembled an instruction stream for one such processor into
instruction streams for a small number of the same kind of
processor.

November, 1994 -- August, 1997: Member Technical Staff, FILOLI
INFORMATION SYSTEMS CO., Palo Alto, CA.  Analysis, architecture, and
programming, for a large software system for insurance underwriting and
policy issuance (NeXT tools, Objective C, Windows for Workgroups,
Microsoft Visual C++, Microsoft Object Database Connectivity).  Duties
included writing complete, stand-alone applications using both NeXT
developer tools and Visual C++ development environment.

July, 1988 -- November, 1994: Senior Software Engineer, MASPAR
COMPUTER CORPORATION, Sunnyvale, CA.  Wrote microcode tools and
microcode for single-instruction, multiple-data, parallel-processing
computers: Wrote emulator (in C) for the parallel elements, and two
microcode assemblers (in C++, lex, yacc -- 14000 lines total) for the
first two generations of the machine.  Prepared emulator test vectors.
Designed, wrote, and maintained about half the microcode in two machine
generations (40000 lines total).  Designed, wrote, and maintained
diagnostic programs for many hardware elements.  Designed, wrote, and
maintained verification programs for diverse microcode, including IEEE
floating-point and I/O routines.

November, 1984 -- June, 1988: Member Technical Staff, SCHLUMBERGER
PALO ALTO RESEARCH, Palo Alto, CA.  Developed high-level algorithms and
software architecture for a virtual reality system with binocular vision
and head-tracking.  Encoded 80% of a Symbolics 3600 implementation
(Common Lisp -- 4000 lines), ported to Lisp and C on a Sun 3, continued
development.  My part (90%) contained 16000 lines of Lisp and C.
Wrote system software for an in-house parallel-processing system
with an array of proprietary single-instruction multiple-data
single-chip microprocessors, featuring five-stage pipelines, bit-serial
data paths, and substantial on-chip parallelism:  Designed hybrid

microassembly/assembly language for the processor, implemented an optimizing cross-assembler.  Designed a high-level language -- basically a functional subset of Lisp -- and implemented an optimizing cross-compiler.  Designed and implemented runtime interface between the hardware and a host Symbolics 3600.  This software comprised 30000 lines of Lisp and 15000 lines of the languages I had created.

December, 1981 -- November, 1984 (half time from February, 1984): Research Scientist, DALMO VICTOR, Belmont, CA.  Substantial software and minor hardware development, for a parallel-processing system for real-time video data compression and transmission: Refined existing algorithms and created new ones for digitally processing video data. Encoded them in high-level languages (Ratfor, Lisp) for test and optimization.  Assisted with recoding in assembly language on specialized hardware.  Evaluated performance.  Sought improvements and advanced features.  Developed top-level architecture for an advanced parallel-processing computer system based on commercial microprocessors.

February -- November, 1984 (half time): Mathematician and Computer Scientist, ALGOS PROJECT (funded by San Jose State University Foundation), Los Altos, CA.  Assisted with formal basis and implementation of a programming language based on category theory.

July, 1979 -- November, 1981: Consulting Physicist to U. S. Department of Energy, as subcontractor/employee of Maxima Corporation, Silver Spring, MD, and of Evaluation Research Corporation, Vienna, VA. Compared scientific, technical and economic aspects of such unusual energy-production technologies as coal gasification, coal liquefaction, oil-shale extraction, and thermal and photovoltaic solar energy.  Sought information (library and interview) and reduced to common basis.

April -- June, 1979: Postdoctoral Research in experimental space astronomy, Space Sciences Laboratory, U. C., Berkeley, CA.  Evaluated and tested microchannel-plate extreme-ultraviolet photon detectors, for extreme-ultraviolet astronomy satellite.  Operated high-vacuum systems (1 nTorr), high-voltage gas-discharge extreme-ultraviolet light sources, laboratory monochrometers, common laboratory electronic equipment. Mounted microchannel plates and operated support electronics for them.

October, 1973 -- March, 1979: Ph.D. thesis research at Space Sciences Laboratory, U. C., Berkeley, CA (including work at NASA Kennedy and Johnson Space Centers, and at White Sands Missile Range).  Employed by group developing extreme-ultraviolet astronomical photometers for sounding rockets and Apollo spacecraft (1975 Apollo-Soyuz Test Project), to study the nearby interstellar medium.  Instrument design and development.  Detailed design and construction of mechanical and

electronic components.  Operated vacuum systems, extreme-ultraviolet
radiation sources and other equipment.  Prepared detailed procedures,
for use by NASA, describing handling, spacecraft installation and
checkout of scientific instruments.  Assisted and supervised personnel
carrying out these procedures.  Prepared instrument flight plan.
Assisted with pre-launch and flight operations.
    Developed interactive and non-interactive computer programs (Fortran)
to read data tapes, reduce data, and compare with model calculations.
Prepared articles for publication in scientific journals.

    October, 1970 -- September, 1972: Laboratory Helper in microbiology
research, Molecular Biology and Virus Laboratory, U. C., Berkeley, CA.
(Fulfilled U. S. Selective Service obligation as conscientious
objector.)  Employed by research group developing apparatus to culture
and identify bacteria automatically, on an enormous scale.  Constructed
matched-hole riveted aluminum structures, installed stainless-steel
plumbing, and accomplished other metal-shop and wood-shop tasks.

    June -- July, 1970: Physics Teaching Assistant, U. C., Berkeley, CA.

    Summers, 1967 and 1968: Laboratory Helper, Cosmic Ray Laboratory,
Physics Department, California Institute of Technology, Pasadena, CA.
Performed miscellaneous operations and data reduction involving an array
of large Wilson-type cloud chambers.

    Summer, 1966: Laboratory Helper, University of Vermont, Burlington,
VT.  Collected and studied Lake Champlain water samples, for water
resources inventory.


SPECIAL  TECHNICAL  SKILLS:
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Commercial Pilot:
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    Hold FAA Commercial Pilot Certificate with single- and multi-engine
landplane ratings and instrument rating.  Former Certificated Flight
Instructor (Airplanes).  Total flight time as a pilot: 1,100 hours.

Computer Programming:
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    About thirty years' experience.
    Familiar with C++, C, Objective C, Common Lisp, Scheme, Java,
Zetalisp, Portable Common Loops, Symbolics Flavors, lex, yacc, Ratfor,
Fortran, and 8086 assembly language.  Some experience with Maclisp,
Pascal, Microsoft Visual C++, 68000 assembly language and 8080

assembly language.

Systems used include Macintosh computers with MacOS X, Xcode, Sun workstations with Unix, Symbolics 3600 with Symbolics operating system, Vax with Unix, Intel workstations running NextOS, Intel workstations running Windows for Workgroups, DEC20 with TOPS20, Apple Macintosh Finder (release 6.x) and Macintosh Programmer's Workshop, Intel MDS86 with ISIS, personal computers with CP/M86 and CP/M80, CDC 6400 with U. C. Berkeley version of SCOPE, and Apollo DM300 with Aegis.

Experience ranges from high-level applications to operating-system development and modification, from numerical scientific computing in Fortran to object-oriented symbolic programming in Lisp, C++ and Objective C, and from high-level languages to microcode.

Electronics:
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Operation of common analog and digital laboratory equipment. Assembly, test and maintenance of various analog and digital systems. Hands-on experience with space-qualified electronics, channel-electron multipliers and microchannel-plate arrays.  Built an Intel 8088 based personal computer from a bare board.

Mechanical Skills:
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Familiar with common hand tools and hand-held power tools for both wood and metal shop.  Experience with fixed non-precision power tools, including drill press, power miter-box saw and band saw.  Use of oxy-acetylene torch for cutting.  Slight experience with metal lathe. About six months plumbing experience, both with threaded pipe and with tubing using Swagelok and AN fittings.  About six months experience with small industrial-scale production of large aluminum structures by matched-hole precision riveting.  Modest woodworking experience appropriate to amateur lutherie.

Optical Work:
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Have made by hand, astronomical telescope mirrors to 40 cm (16 inch) diameter, for use in home-made telescopes.

Vacuum Systems:
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Familiar with plumbing and operation of diverse vacuum systems, including mechanical and adsorption roughing pumps, oil-diffusion pumps, VacIon and titanium sublimation pumps.  Have operated vacuum monochrometers and miscellaneous support systems.

HOBBIES AND ACTIVITIES:
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     Astronomy, reading, science fiction, play guitar, build guitars,
computer science, ballroom dancing, marine biology, cats, roses.