

# Curriculum Vitae

## John M. Strawn, Ph.D.

### Professional Profile

Several decades of involvement in software, digital audio, digital music, digital signal processing, and processor architecture. Successful independent software consultant in high-level languages and assembly language. Seasoned testifying expert with experience in patent and class action litigation, skilled at explaining complex ideas to attorneys and juries. Stanford Ph.D. Former Fulbright Scholar. Prolific author. Experienced manager with long-range research and development experience. Facile with foreign languages and working with people from outside the USA.

### Professional Experience

- From: 1992      **S Systems, Inc.**  
To: Present    Larkspur, CA  
Position: *Owner*  
Duties: Full-time independent consultant:
- **Programming** hand-crafted audio and music software for signal processing, written in C, C++, JAVA, and especially assembly language for digital signal processing chips. Consulting on processor architecture and networking.
  - **Testifying Expert witness** in patent litigation relating to software, computers, signal processing.
- From: 1987      **Yamaha Music Technologies USA**  
To: 1991      Larkspur, CA  
Position: *1989-1991: President; 1987-1989: Vice President*  
Duties: Helped establish and manage a nine-person Ph.D.-level research group, including site search, architectural design, construction, move-in, and hiring. Conducted original research on electronic musical instruments, software, micromachining, networking, and recent technological developments. Extensive experience designing scientific, engineering, and musical object-oriented applications, especially C++ (UNIX). Research on Yamaha's Vocaloid started in this group. Patents listed below.

- From: 1986      **S Systems**  
To: 1988      Larkspur, CA  
Position: *Full-time Consultant*  
Duties: This was my first stint as a consultant. See Consulting Assignments, below.
- From: 1985      **Lucasfilm/Droid Works**  
To: 1986      San Rafael, CA  
Position: *Programmer*  
Duties: Full-time programming experience as an employee, designing signal-processing modules and writing (96-bit VLIW) microcode for the ASP/SoundDroid developed by James A. Moorer. Experience in audio and video post-production. Extensive work in C (Unix). Another six months full-time experience writing tightly packed assembly code for the TI TMS32010 signal processor, especially for a two-channel hard-disk audio record playback unit that played without bugs on the exhibit floor of the National Association of Broadcasters convention, 1986.
- From: 1976      **Stanford University**  
To: 1985      Stanford, CA  
Position: *Doctoral Student*  
Duties: Nine years programming experience developing code in high-level languages (Algol, Fortran, SAIL) and PDP-10 assembly language for musical and audio signal processing applications during doctoral thesis work. Includes original published research in spline fitting and pattern recognition, a 30,000-line two- and three-dimensional graphical editor for waveforms and spectra, implementation (with John Gordon) of the short-time Fourier transform, device drivers, and libraries for graphic user interfaces. Also part-time consulting work:
- SRI International (FORTRAN for mechanical engineering).
  - Mattel Electronics (music in consumer electronic toys).
  - IntelliGenetics (ALGOL-like code for biotechnology).
  - Digital Keyboards (product specification and complete manuals for GDS and Synergy Synthesizers).
- From: 1972      **Revox**  
To: 1972      Long Island, New York  
Position: *Summer intern*  
Duties: Solder cables, write German- and Dutch-English translations, manufacture PC boards, assemble hardware.

## Education and Training

<u>Year</u>	<u>College/University</u>	<u>Degree</u>
1973	Oberlin	B. Mus, double degree in organ performance and music theory. Experience with analog synthesizers and digital music synthesis, BASIC, FORTRAN, MUSIC V on an IBM 360.
1973-1975	Technical University, Berlin	Fulbright Scholar. Graduate-level coursework in music theory/history, audio engineering, electronics, information theory, cybernetics, Japanese; all coursework in German. Extensive recording studio and live concert sound reinforcement experience. PDP-11 and PDP-8 assembly and machine language. Travel throughout Europe.
1975-1976	IBM Thomas Watson Foundation	Grant to study electronic music, Tokyo, Japan, 1976. Live performances on piano and Roland System 700 analog synthesizer. Also travel through Turkey, Iran, Afghanistan, Pakistan, India, Thailand, and Hong Kong.
1985	Stanford	Ph.D., CCRMA. Advisor: John Chowning. Graduate course work in music, computer and processor architecture, assembly-language processing, digital audio, acoustics, and digital hardware. Dissertation on analysis of music instruments with the short-time Fourier transform. Software development experience listed elsewhere in this resume.

## Expertise

- Implement/optimize signal processing algorithms: Fourier transform (FFT), discrete cosine transform (DCT), DTMF, speech synthesis.
- Port/optimize audio compression algorithms: AC-3, MP-3, AAC.
- Implement audio algorithms: reverberator, pitch shifter, sample rate converter, compressor, filter, flanger, 3-d audio (Dolby surround), dither.
- Implement music synthesis (additive, physical modeling, wavetable, FM).
- Create bug-free software from academic signal processing research.
- Work in floating- and fixed-point math.
- Assembler, object-oriented, C, C++.
- Extensive experience optimizing code in assembler
- PC, Mac, Unix.
- DSP architectures: Motorola 56000, 56300, and 56800 families; TI TMS320C10 and TMS320C54 family; Code Composer Studio; Analog Devices 21xx family and TigerSharc; VLIW; custom processors; I learn new architectures quickly.
- Embedded processors: Hitachi SH-DSP, SH3-DSP, SH-4, and SH-5; ARM7/ARM9; configurable processors (Tensilica).

- Processor architecture.
- Debugging hardware prototypes.
- Audio networks, such as AES/EBU (IEC 60958), IEEE-1394/FireWire, AV/C, 61883, mLAN, and others.
- File downloading.
- Practical audio experience in live sound and in studios.
- Testifying expert witness (including expert reports, deposition).
- Software analysis for litigation.
- Functionally bilingual in German; able to read French, Dutch; some Japanese

### **Expert Witness and Litigation Support Experience**

Summary: patent litigation, class action litigation, ITC actions, and USPTO declarations relating to software (in a wide variety of areas), cell phones, audio, music, speech, processor architecture, compression, multimedia, digital cameras, telephony, video games, and file downloading, among others. Testimony at trial, prior art analysis, infringement analysis, expert reports, deposition, tutorials, Markman hearings.

Date: 2011 - present  
**Quinn Emanuel, New York**  
 Case: Motorola v. Apple (Certain Wireless Communication Devices, Portable Music and Data Processing Devices, Computers and Components Thereof, ITC 337-TA-745).  
 Project: Expert reports relating to Apple Accused Products (iPhones), technical prong of domestic industry, and non-invalidity, focusing on cell phone GPS. Source code analysis. Deposition. Scheduled to testify at trial.

Date: 2010 - present  
**Quinn Emanuel, San Francisco**  
 Case: Motorola v. Apple, Florida Southern District, 1:2010cv23580.  
 Project: Undisclosed.

Date: 2008-9, 2011-present  
**Alston Bird, Atlanta**  
 Case: Move Inc. v. Real Estate Alliance Ltd et al., 2:07-cv-02185, Central District of California, Los Angeles.  
 Project: Expert reports concerning real estate sales website. Source code analysis. Deposition. Scheduled to testify at trial.

Date: 2010-2011  
**Finnegan, Henderson, Washington, DC**  
 Case: HTC v. Apple (In the Matter of Certain Portable Electronic Devices and Related Software, ITC 337-TA-721).  
 Project: Expert reports relating to technical prong of domestic industry for 24

HTC Windows Mobile cell phones, including source code analysis relating to user interface, memory, and caller ID. Consulting expert relating to iPhone, iPad, and iPod touch concerning invalidity and power management.

- Date: 2010-present  
Case: **Robins, Kaplan, Miller, & Ciresi, Minneapolis**  
Project: Fair Isaac v. Actimize and NICE, 1:2009cv00688, Delaware. Infringement and source code analysis relating to financial transaction verification.
- Date: 2010  
Case: **Orrick, Washington, D.C.**  
Project: Affinity Labs v. Alpine Electronics, JVC Kenwood, et al., 08-171-RC, Eastern District Texas. Involved car audio, marine audio, and home theatre products that connect to iPod/iPhone. Rebuttal expert report on non-infringement. Deposition.
- Date: 2009-10  
Case: **Wolf Haldenstein, New York**  
Project: In re Apple & ATTM Antitrust Litigation, Northern District of California, San Jose, C 07-5152. Analyze iPhone source code for antitrust plaintiffs. Expert report and various declarations, in particular regarding class certification. Deposition.
- Date: 2008-10  
Case: **Paul Hastings, Palo Alto, CA**  
Project: Konami Digital Entertainment v. Harmonix Music Systems, Texas Eastern District 6:08-cv-00286. Analyze Rock Band video game source code (Playstation 2, PS3, Wii, XBox). Expert reports. Two-day deposition.
- Date: 2009-10  
Case: **Jones Day, Palo Alto, CA**  
Project: SanDisk v. LSI, California Northern District, 3:09-cv-02737. Attend tutorial and Markman hearing regarding MP3 patent litigation.
- Date: 2009  
Case: **Weil Gotschal, Redwood Shores, CA**  
Project: Samsung v. Kodak (In the Matter of Certain Digital Cameras, ITC 337-TA-671). Analyze Samsung cell phone source code relating to digital cameras. This involved baseband chips from Qualcomm, Philips, Agere, Texas Instruments; register-level code for camera image sensors from Samsung, Sony, Micron, Omnivision; Windows Mobile 5 and 6 digital camera device drivers; Qualcomm BREW 2 and BREW 3 cell phone operating systems; patents involving digital cameras, Bayer subsampling, and pixel interpolation; and standard digital optical concepts such as RGB, YUV, YCbCr, EXIF, and JPEG.

Date: 2009      **Finnegan, Henderson, Washington, DC**  
Case: Voice Domain Technologies LLC v. Philips Electronics North America Inc. et al., Western District of Oklahoma, 5:08-cv-00701.  
Project: Declarations for Markman hearing on hand-held consumer devices.

Date: 2009      **THAT Corporation; McDermott Will & Emery, Boston**  
Action: US Patent Application 09/638,245, BTSC Encoder.  
Project: Declaration to USPTO regarding non-obviousness for audio in television.

Date: 2007-8      **Fish and Richardson, Atlanta**  
Case: Nice Systems Inc. and Nice Systems Ltd. v. Witness Systems Inc. Civil Action No. 06-311-JJF, Delaware District.  
Project: Expert reports concerning telephone call centers (telephony, software, hardware architecture, digital recording.) Deposition, jury trial testimony.

Date: 2005-7      **Fish and Richardson, San Diego, CA**  
Case: Lucent Technologies Inc. v. Gateway, Inc., et al., defendants, and Microsoft Corporation, Intervener. Case No. 02-CV-2060 B (CAB) consolidated with 03-CV-0699 B (CAB) and 03-CV-1108 B (CAB).  
Project: Expert for defense (Microsoft) involving audio compression and MP3. Deposition and two days testimony at three-week jury trial, cross-examined by Kirkland and Ellis. Prepared 7 expert reports (total 497 pages) on non-infringement and invalidity including 20 claim charts and 15 other substantive attachments. Analyzed over 4000 pages of C/C++ source code; analysis of assembly and machine code. Worked directly with German documents.  
Status: Judge Brewster overturned jury decision and ruled in favor of defense. Judge Brewster's decision upheld on appeal, <http://www.cafc.uscourts.gov/opinions/07-1546.pdf>

Date: 2007      **Morrison and Foerster, Los Angeles**  
Case: 3:06-cv-7736 CA Northern District, Seer Systems v. Yamaha  
Project: Prior art research for music synthesis.

Date: 2006-7      **Mayer Brown Rowe & Maw, Houston, TX**  
Case: 2:06-cv-156, Digital Technology Licensing (DTL) v. Cingular Wireless  
Project: Claim charts, technology background for microphone in cell phones.

Date: 2007      **Meyer & Associates Co. LPA, Columbus, Ohio**  
Case: Health Science Products LLC and Kairos & Associates, Inc., v. Sage Software SB, Inc.  
Project: For class action litigation, analyze database software before and after release of ACT 2005.

Date: 2005-6      **Black Lowe & Graham, Seattle**  
Case:            Digeo, Inc. v. Audible, Inc., Case No. C05-00464-JLR, Seattle  
Project:        Expert reports involving Internet file downloading. Analyze C/C++ source code. Deposed for Markman hearing.

Date: 2006            **Ropes and Gray, Palo Alto**  
Case:            MediaTek, ASUSTek & ASUS v. Sanyo.  
Project:        Prepare claim charts on 24-hour notice. Assist in preparation of tutorial.

Date: 2006            **Wilmer Hale (New York)**  
Case:            Information Technology Innovation, LLC v. Motorola, Inc. et al.,  
Northern District of Illinois 04-C-7121.  
Project:        Provide and supervise an expert witness colleague who prepared an expert report on infringement.

Date: 2004-5        **Weil, Gotshal & Manges, New York**  
Case:            Antor Media Corporation v. Apple Computer, Inc., Microsoft Corporation, RealNetworks, Inc., Civil Action No. 2:03CV320 (E.D. Texas 2004)  
Project:        Prior art regarding file downloading.

Date: 2005            **Trop, Pruner & Hu, Austin, TX**  
Project:        Prior art involving signal processors.

Date: 2002-3        **Robins, Kaplan, Miller, & Ciresi, Minneapolis**  
Case:            Intergraph v. Dell et al., EDTX, 2-02cv-312  
Project:        Prior art for hardware architecture, virtual memory and cache memory.

Date: 1997-8        **Cesari and McKenna, Boston**  
Case:            Lucent vs. Young Chang/Kurzweil  
Project:        Prior art for music synthesis, digital hardware, software, architecture.

Date: 1994            **Small, Larkin, Los Angeles**  
Case:            L.C. Concepts v. Digital Theatre Systems (DTS)  
Project:        Prior art for cinema sound equipment in USA and Germany.

### **Consulting Assignments**

From: 2011        **Client: iZotope**  
To: 2011            Boston  
Duties:        Port iZotope's pitch correction effect from C++ source code to Avid TDM environment in Motorola 56000 family assembly language.

From: 2009        **Client: Congruity**  
To: 2009            Palo Alto  
Duties:        For this music industry startup, create audio effects in Freescale DSPM56364 assembly language. Write and debug code without access to

hardware, working only with software tools. Initial delivery of code ran bug-free in target hardware.

From: 2008      **Client: DTS Digital Cinema (now Datasat Digital Entertainment)**  
To: 2008      Location: Agoura Hills, CA  
Duties: For DTS Digital Cinema's XD20 eight-track cinema media player (this is the box that sits in the movie theater projection booths for playback of multi-channel audio and video), port DTS Coherent Acoustics decode (two versions, one 8-channel, one stereo), DTS Digital Cinema 8-channel decode, and DTS Neo6 5.1 decode from DTS Digital Cinema's existing XD10 cinema media player. This required me to isolate the four algorithms by stripping away unneeded code; integrate the four algorithms into Motorola 56721 dual-core processor; and write new wrapper code in assembly language. Responsible for approximately 25,000 lines of assembly language source.

From: 2007      **Client: Berkeley Design Technology, Inc. (<http://www.bdti.com/>)**  
To: 2008      Location: Oakland, CA  
Duties: Contribute to research and writing of the following articles on processor architecture at BDTI's website Inside DSP (<http://www.insidedsp.com/>):

- TI Offers OMAP3 Application Processors to the Mass Market
- Avnera releases ASSPs for wireless audio applications
- XMOS Introduces Low-cost Multi-core Chip Family with Programmable I/O
- VeriSilicon's New Silicon IP Solution for HD Audio
- Behind the scenes: Dolby's acquisition of Coding Technologies
- Tips and Tricks for Debugging Audio

Other BDTI assignments are listed below.

From: 1995      **Client: Yamaha**  
To: 2007      Location: Hamamatsu, Japan  
Duties: Chair, AES standards working group SC-02-12 on digital audio networking via IEEE-1394 (Firewire), with the support of Yamaha. Involved a trip to AES conventions twice a year, including one in Europe. Past member, IEC TC100 TA4, Digital System Interfaces. Various public appearances worldwide and various company site visits to discuss multimedia networking, audio over 1394 and Yamaha's mLAN.

- From: 2005      **Client: Sonic Network**  
 To: 2006      Location: Somerville, MA  
 Duties: For this well-known provider of wavetables, synthesis software, and cell phone ring tones (among others), provide and supervise subcontractors for these projects:
- Design and implementation of filters for sample rate conversion;
  - Design and implementation of filters following the DLS-2 specification (used in cell phones for ring tones);
  - Port synthesizer code to Tensilica HiFi2 audio engine.
- From: 2004      **Client: Bias, <http://www.bias-inc.com/>**  
 To: 2006      Location: Petaluma, CA  
 Duties: For this well-known provider of audio software, provide and supervise a subcontractor to port a complicated digital signal processing algorithm into the DigiDesign TDM Environment, in Motorola 56K assembly language.
- From: 2005      **Client: Audio Research Labs, [http:// www.audioresearchlabs.com/](http://www.audioresearchlabs.com/)**  
 To: 2005      Location: Scotch Plains, NJ  
 Duties: For ARL founder Schuyler Quackenbush provide and supervise a subcontractor to design and implement a digital filter algorithm in Motorola 56K assembly language.
- From: 2004      **Client: Verance, <http://www.verance.com/>**  
 To: 2005      Location: San Diego, CA  
 Duties: Working closely with Verance R&D staff, implement the Verance Content Management System/Audio-Visual (VCMS/AV) watermarking technology for motion picture sound (now known as Cinavia) in Motorola 56300 assembly language in the TC Electronics M6000 environment. This program is used by major film studios starting early 2005 to watermark nearly every DVD released. Travel at client's request to TC Electronics headquarters in Denmark to facilitate integration. Provide and supervise a subcontractor to assist with filter design, filter implementation, and other tasks. More than 30,000+ lines of 56K assembler source, several hundred pages of documentation, a dozen CD-ROMs of debugging data and lab notebooks.
- From: 2002      **Client: Universal Audio (<http://www.uaudio.com/>)**  
 To: 2004      Location: Santa Cruz, CA  
 Duties: For this well-known manufacturer of audio plugins, port two audio processing algorithms (Pultec filter, LN1176 stereo compressor) from C/C++ to Motorola 563xx assembly language in the DigiDesign ProTools TDM environment, including numerical approximation and streamlining the original C/C++ implementation. Publicly released 2004. Contribute extensively also to port of an extremely complicated high-end reverberator, and to another equalizer.

- From: 2003      **Client: Stretch** (<http://www.stretchinc.com/>)  
To: 2004      Location: Mountain View, CA  
Duties: For this software configurable processor startup, study how to port MPEG-2 AAC and MP-3 decode reference C++ code to 16- and 32-bit integerized C. Do the same for MP-3 encode based on publicly available source. Learn their software configurable architecture well enough to write optimizations.
- From: 2003      **Client: RIC International Precision Translation Services**  
To: 2003      Location: Cambridge, MA  
Duties: For this major translation house, proofread German-English translations involving, among other things, audio compression (including German-language doctoral dissertations).
- From: 2003      **Client: Analog Devices**  
To: 2003      Location: Santa Clara, CA (Audio Rendering Technology Center)  
Duties: Port music synthesis algorithms in assembly language for the ARM7/TDMI processor, following ARM's C calling conventions. This project ran under very tight time constraints, cost only 2/3 of the projected budget, and resulted in code that runs much faster than the original implementation.
- From: 2002      **Client: Dorrough Electronics** (<http://www.dorrough.com>)  
To: 2003      Location: Chatsworth, CA  
Duties: Implement in C and Analog Devices Sharc 21161 assembly language a novel scheme based on their patented technology to improve the perceived loudness of audio signals sent over broadcast. Provide a subcontractor who made significant contributions to filter design.
- From: 2002      **Client: Analog Devices**  
To: 2002      Location: Wilmington, MA (Ray Stata Technology Center)  
Duties: After an on-site visit to learn more about the technology and meet the team, I made recommendations on changes to architecture for a new version of an idiosyncratic signal processing chip. I also provided code examples for the new architecture.
- From: 2001      **Client: Tensilica**  
To: 2002      Location: Santa Clara, CA  
Duties: For this configurable processor IP core company, implement a highly optimized version of the modified discrete cosine transform (MDCT) for audio compression. Extensive investigation of theory and variants of the MDCT. Also port MPEG-2 low-complexity AAC decode and MP3 encode from Thomson reference C++ code to 16-bit integerized C. Prepare various optimizations closer to the hardware than C++ usually allows.

From: 1999      **Client: Berkeley Design Technology, Inc.** (<http://www.bdti.com/>)  
To: 2001      Location: Oakland, CA  
Duties: 

- For BDTI's Buyer's Guide to DSP Processors, 2001 Edition, contribute major portions of the text analyzing processor architectures including the Analog Devices TigerSharc, and contribute also to the analyses of Motorola 56300, 56800, and 56800E processors; verification and in some cases re-writing assembly-language implementations of BDTI's benchmarks;
- Prepare written analyses of Hitachi SH-DSP, SH3-DSP, SH-4, and SH-5 processor architectures. This again included verification and in some cases re-writing assembly-language implementations of BDTI's benchmarks;
- Implement assembly-language routines related to multimedia compression in ARM7/ARM9 processor assembly language;
- Develop and present a four-hour presentation on audio compression, given first at Embedded Processor Forum, June, 2000; contribute to a four-hour presentation on digital audio and music given by Dana Massie at the same Embedded Processor Forum; revised and presented both talks at Microprocessor Forum, October 2000; both talks revised again with emphasis on streaming audio and presented at Embedded Processor Forum, June, 2001.

From: 1995-6      **Client: Audio Precision** (<http://www.audioprecision.com>)  
And 1998-9      Location: Portland, Oregon  
Duties: Audio Precision (Portland, Oregon). For their System 2 audio measurement device, developed double-precision Fourier transform (FFT) in assembly language for Motorola 56002 processor, including (Microsoft) C code to study where to maintain double-precision. Also, extensive code for AES/EBU and square wave measurement test suite, including jitter and eye pattern (assembling bit map for graphics display in 56002 data memory space). 28K+ lines of assembly language source. 1998-1999: Revise Audio Precision System 2 code for new 96 kHz Cascade hardware (Motorola 56303).

From: 1997      **Client: Euphonics (later part of 3COM)**  
To: 1999      Location: Boulder, CO  
Duties: Implement Dolby AC-3 decoder (used in Dolby Digital cinema sound) in 16-bit integer assembly language on new Analog Devices 16-bit integer AD1818 processor (PCI SoundComm). 20K+ lines of assembler source. Passed first round of Dolby testing on first try. Integrate with Euphonics' Real-Time Kernel operating system.

From: 1996      **Client: Digital Technics (DTI)**  
To: 1997      Location: Baltimore, MD.  
Duties: Implementation of CCITT R2 encoder/decoder (similar to DTMF) in Motorola 56002 assembly language, based on Goertzel algorithm. 13K+ lines assembler. Deployed in the field in Asia and South America.

From: 1996      **Client: VM Labs**  
 To: 1996      Location: Los Altos, CA  
 Duties: For this multimedia chip startup, provide detailed critique of their proprietary DSP chip architecture.

From: 1993      **Client: Oculix**  
 To: 1995      Location: Switzerland  
 Duties: Motorola DSP 56000 assembly language for numerical and FFT analysis of real-time data gathered by laser from the human eye for medical applications. 150K source.

From: 1993      **Client: Centigram Communications Corporation.**  
 To: 1994      Location: Silicon Valley CA (apparently now part of SS8 Networks)  
 Duties: Port of speech synthesis code from TI TMS320E17 assembly language to Motorola DSP 56002 assembly language on Motorola PC Media card; port to Analog Devices ADSP 2115 assembly language on Echo Personal Sound System.

From: 1993      **Client: Atari**  
 To: 1994      Location: Sunnyvale, CA  
 Duties: implement physical modeling music synthesis techniques on custom RISC/DSP chip inside Jaguar game console. Prepare written comments on a new custom DSP architecture.

From: 1993      **Client: Euphonics**  
 To: 1993      Location: Boulder, CO  
 Duties: For this software music synthesizer company, write C routines to emulate certain hardware elements in the target architecture. This allowed the company to study aspects of caching parameter updates, for optimizing real-time performance.

From: 1993      **Internal Project**  
 To: 1993      Location: Bay Area, CA  
 Duties: For a research project involving DSP architecture, write a series of Java classes to emulate the typical components of a DSP chip.

From: 1987      **Client: Shure**  
 To: 1988      Location: Evanston (now Niles), IL  
 Duties: Working from the written specification for a proprietary algorithm, develop C and TI TMS 32010 assembly language for a multi-channel consumer audio product prototype.

From: 1987      **Client: NeXT, Inc.**  
 To: 1988      Location: Silicon Valley, CA  
 Duties: NeXT Inc. Developed, debugged, and documented more than 50 routines in the Motorola DSP 56000 assembly language vector library (with Julius

O. Smith; source code printout is 2" thick.). While working off-site for over a year before NeXT was publicly released, maintain secrecy about the fact that NeXT would include a 56000 processor.

From: 1986 or 1987      **Client: Sonic Solutions**  
To: 1986 or 1987      Location: San Francisco CA  
Duties: As one of the first consultants hired by Sonic Solutions (located in their first office in San Francisco), port their C-language noise-reduction code from one flavor of Unix to another.

Other experience:

- Studies of micromachining and nanotechnology.
- Experience with the Star Semiconductor SPROC chip, the IBM MWAVE chip and operating system, OS-9, and Spectron's SPOX operating system.

## Patents

<u>Patent Number</u>	<u>Date Issued</u>	<u>Title</u>
5,569,871	October 29, 1996	Musical tone generating apparatus employing microresonator array (co-inventor; micromachining) As Vice-President and President of Yamaha Music Technologies Inc., I supervised the patent applications by my employees that resulted in US patents 5,245,130, 5,288,938, 5,386,568, 5,422,956, 5,536,902, and 5,541,358.

## Teaching appointments

From: 2003      **University of Colorado at Denver, College of Arts & Media**  
To: 2008      Denver, CO  
Position: *Lecturer, College of Arts & Media*  
Duties: Teach special topics course on audio data compression to upper-level undergraduate and graduate students.

## Major Publications

- "Approximation and Syntactic Analysis of Amplitude and Frequency Functions for Digital Sound Synthesis." *Computer Music Journal* 4(3):3-22, 1980.
- *Modeling Musical Transitions*. Ph.D. Thesis, Stanford University, 1985. 243 pp.
- (with C. Roads). *Foundations of Computer Music*. MIT Press, 1985. 600 pp.

- *Digital Audio Engineering: An Anthology*. Madison, WI: A-R Editions, 1985. 144 pp.
- *Digital Audio Signal Processing: An Anthology*. Madison: A-R Editions, 1985. 283 pp.
- "Orchestral Instruments: Analysis of Performed Transitions." *Journal of the Audio Engineering Society* 34(11):867-80, 1986.
- "Editing Time-varying Spectra." *Journal of the Audio Engineering Society* 35(5):337-51, 1987.
- "Analysis and Synthesis of Musical Transitions Using the Discrete Short-time Fourier Transform." *Journal of the Audio Engineering Society* 35(1/2):3-14, 1987.
- "Implementing Table Lookup Oscillators for Music with the Motorola DSP56000 Family." Presented at the 85th Convention of the AES, 1988. Preprint No. 2716.
- "Digital Audio Representation and Processing." *Multimedia Systems*, edited by John F. Koegel. ACM and Addison-Wesley, 1993.
- "Technological Change: The challenge to the audio and music industries" (written version of AES keynote address). *Journal of the Audio Engineering Society*, March 1997.
- (with James Grunke, Ben Novak, Bruce Pennycook, Zack Settel, Phil Wiser, and Wieslaw Woszczyk). "AES White Paper: Networking Audio and Music using Internet2 and Next Generation Internet Capabilities." *Journal of the Audio Engineering Society* 47(4):300-310, April 1999. Presented (with Betsy Cohen and AES President Marina Bosi) to White House National Economic Council, December 1998. <http://www.aes.org/technical/i2.html>.
- (with Yamaha's Mike Overlin). "Playing with Fire," *Electronic Musician*, May 2003, pp. 31-38 ([http://emusician.com/ar/emusic\\_playing\\_fire/index.htm](http://emusician.com/ar/emusic_playing_fire/index.htm), on audio networking over 1394).

### **Professional Associations and Achievements**

- Fellow (1996), Audio Engineering Society.
- Convention Co-chair, 2008 AES Convention, San Francisco.
- Convention Chair, 2006 AES Convention, San Francisco.
- Convention Chair, 2004 AES Convention, San Francisco. Recipient of an Anderton Award, Pro Sound News, December 2004, p. 30.
- Keynote Speaker, November 1996 Audio Engineering Society Convention.
- Elected member of the AES Board of Governors, 1992-1994; again 2005-2007.
- Chair, Audio Engineering Society Convention Policy Committee, 2006-2008.
- Technical Papers chair, 1992 AES Convention, San Francisco (first AES San Francisco Convention). Technical Papers co-chair, 2002 AES convention, Los Angeles.
- Conference Chair, 1987 Audio Engineering Society (AES) International Conference on Music and Digital Technology (Los Angeles).
- Former member of review board, *Journal of the Audio Engineering Society*.

- Assistant Editor, *Computer Music Journal*, (MIT Press), 1978-1982.
- Co-founder (1980), International Computer Music Association.
- Founder and Series Editor (1984-1996), *The Computer Music and Digital Audio Series*.
- Honorary Member (since 1998), Midi Manufacturers Association (MMA).
- Technical presentations and session chair at various conferences such as Audio Engineering Society, Acoustical Society of America, International Computer Music Conference, DSP World.
- Conference paper reviewer for many International Computer Music Conferences (ICMC).
- Member, Acoustical Society of America. Senior Member, IEEE.

### **Further qualifications**

Functionally bilingual in German. Reading ability in French, Dutch. Some experience with Spanish, Italian, Japanese, Latin. Separate list of foreign language experience available on request. Extensive experience traveling abroad and communicating with foreigners.

### **Other activities**

I currently enjoy spending time with my family, hiking, and weightlifting. In earlier years I have especially enjoyed travel, aikido, operating a Maerklin Z-gauge model railroad, performing a wide variety of folk and classical music, and attending musical events. Member of Toy Train Operating Society of America.

### **References**

Full vita and references from industry, academia, and lawfirms available on request.

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