Dana C. Massie

Summary

Professional Experience

2005- **Director of Algorithm Development**, Audience, Inc.

Manager of team of algorithm developers and software engineers, developing the most advanced audio processing algorithms available for speech enhancement.

2003- 2005 **Senior Research Director**, Waves, Inc.

Developed software DSP algorithms for analysis and resynthesis of audio signals for professional audio plug-in applications. Lived in London for one year, and traveled to Waves Israel headquarters nine times to help manage Waves algorithm developers.

2002-2003 **Manager of Audio Hardware**, Apple Computer, Inc.

Managed team responsible for standard audio input output subsystem (the headphone jack) on Apple desktop and laptop platform (not the iPod). Also managed speaker specification for built in speakers. Worked with audio driver development team on DSP algorithms, driver software hardware tradeoffs and requirements, and future product planning. Developed audio specifications and test procedures, using the Audio Precision audio analyzer. Led cost reduction efforts, which also helped to improve quality.

2000-2002 **Co-Founder - FluxNetwork, Inc.**

FluxNetwork developed multimedia technology for handheld PDA devices, and mobile phones. Customers included Hitachi, Microsoft, Sundance Film Festival, Hewlett-Packard, others.
Also provided digital audio consulting services to customers in the professional audio industries, such as Beatnik and Tascam.

1999-2000 **Beadgame Consulting, Santa Cruz, CA**

Developed and gave lectures for BDTI, Inc. at Embedded Processor Forum on applications of DSP to digital audio, and also at General Dynamics on DSP software development.

1995 - 1999 Director - Creative Advanced Technology Center**,** Scotts Valley, CA
(Creative acquired E-mu Systems in 1993)

Managed US$5 million annual budget for 35+ engineers and researchers, in 4 groups:

- VLSI
- Software Drivers/Applications,
- Advanced DSP Algorithms, and
- 3D/Environmental Audio

Expanded Tech Center from 16 to 30 people. Personally recruited about 20 of the 30 staff.

Led development teams for all core technologies in "Sound Blaster Live!" Creative Technology's high-end PCI sound card, including a 2-million transistor VLSI audio accelerator chip (EMU10K1). Member of EMU10K1 chip architecture team. (Sound Blaster Live family generated over US$300 million annual business for Creative, and is currently Creative's highest volume and highest profit margin product line.)

Invented Environmental Audio. Led team that implemented Environmental Audio for Creative, including DSP algorithms, architectures, DSP compiler, Windows drivers, and open standards based APIs.

Initiated and led standards efforts, which resulted in the acceptance of EAX (Environmental Audio eXtensions) by game developers, Microsoft, MPEG4, and IASIG (an audio standards body). Evangelized development of open API standards within the corporation, which previously had only created proprietary APIs, or adopted external APIs.

Directed team that introduced SoundFont API into MPEG 4 standard which later collaborated with Microsoft to create new unified standard incorporating SoundFont and DLS, incorporated in MPEG 4 as DLS 2.0 standard. Collaborated with game developers and customers to develop key technology and marketing strategies. Trained Singapore and American product marketing teams on customer benefits for EMU0K1 technologies, including Environmental Audio, sample rate conversion, digital I/O, and overall multi-media system architecture. Participated in press events for SB Live! Launch.

Coordinated technology transfer to Singapore product development teams, which developed PC board, applications, and non-effects-engine drivers for Sound Blaster Live. Participated actively in technology evaluation and strawman business plan creation and evaluation for corporate decision making.

1992 - 1995 DSP Research Manager - E-mu Systems, Inc. /Creative Advanced Technology Center, Scotts Valley, CA

Created and managed a group of 10 researchers in 3D audio and Advanced Music Synthesis for both professional musical instrument design and mass market multi-media applications.

Performed research and development and defined research goals for advanced music synthesis, 3D audio and audio processing techniques. Research areas include ARMA spectral analysis, filter design, 3D audio modeling.

1989 - 1992 Digital Signal Processing Engineer / E-mu Systems, Inc. Scotts Valley, CA

Invented advanced digital filter designs for real-time music synthesis applications, and algorithms and user interface to control them, and deployed these in a successful commercial musical instrument.

Designed and implemented a complete digital audio -multi-effects subsystem using the Analog Devices 2105 DSP chip. Effects included reverb, digital equalization filters, chorus and flanging, non-linear distortion, mixing, and routing.

1988 -1989 Software Engineer / NeXT, Inc. - Audio & Music Group Palo Alto, CA

Worked in team developing DSP music and audio subsystem for NeXT personal computer, one of the earliest DSP subsystems for a personal computer.

Developed utilities for digital audio data compression and decompression, sample rate conversion, and format conversion using Motorola 56001 DSP chip within the NeXT Computer UNIX environment. Evangelized potential audio developers. Collaborated in sound architecture development.

1986 - 1988 Software Engineer / WaveFrame Corporation Boulder, CO

Responsible for the design and coding of the VoicEdit editing software for the AudioFrame, a high-end Digital Audio Workstation. This user interface code included functions for recording, editing, crossfade looping, auto-looping, graphic display, file manipulation, and modification of all real-time modulation parameters such as LFO, Envelopes, etc. This code contained about 30,000 lines of Microsoft Windows C code, for which I had primary responsibility.

Implemented Cross-Fade and Auto-Looping algorithms. Collaborated in design of digital shelving equalizer algorithm.

1983 - 1986 Software/ Systems Design Engineer / E-mu Systems, Inc. Scotts Valley, CA

Did research and implementation of algorithms and architectures for computer music. Worked on Emulator 2, Emax, and E-mu SP-12 products.

Developed C and UNIX platform for signal processing research and for factory system for sampled sound signal processing. Set up UNIX based development systems for National 32000 microprocessor.

Invented Cross-Fade and Auto-Looping algorithms for Wavetable synthesis.

Wrote, debugged, and used a wide variety of signal processing algorithms such as digital filters, spectrum analysis, waveform encoders and decoders, sample rate converters, looping routines, signal editors, dynamic range compression routines, and others. Created initial sound libraries for instruments before instrument hardware was finished.

Helped in the architecture, analysis, and testing of large (50,000-transistor) silicon-compiled custom integrated circuit (E-Chip) used in Emax-I Sampler.

Invented product concept for Digidesign Sound Designer program, as documented in AES and ICMC papers. Participated extensively at night and on weekends with Digidesign in the design and implementation of the Sound Designer signal processing and editing program for the Emulator II sampler.

1981 - 1983 Design Engineer / Datatronix, Inc. Reston, Virginia

Hardware engineer on microprocessor telecommunications systems and large analog consoles for professional audio (these were the famous API consoles from the 1960's which Datatronix manufactured for a few years).

Designed all of the hardware and software for microprocessor controlled 48-voice voice synthesizer for the statistical generation of dynamic telephone traffic signals. Installed system; devised and tested theories to explain results.

Patents

U.S. Patent N. 5,943,427: "Method and apparatus for three dimensional audio spatialization," inventors Dana C. Massie et Al. issued August 24, 1999

U.S. Patent N. 5,748,747: "Digital signal processor for adding harmonic content to digital audio signal," inventor Dana C. Massie issued May 5, 1998

U.S. Patent N. 5,524,074: "Digital signal processor for adding harmonic content to digital audio signals," inventor Dana C. Massie issued June 4, 1996

U.S. Patent N. 5,248,845 co-authored with David P. Rossum entitled: "Digital Sampling instrument," issued Sep 28, 1993

U.S. Patent N. 5,698,807: co-authored with David P. Rossum entitled: "Digital sampling instrument," issued Dec. 16, 1997

Publications

"Wavetable Sampling Synthesis," D.C. Massie; in "Applications of Digital Signal Processing to Audio and Acoustics"; edited by Mark Kahrs, Karlheinz Brandenburg, Kluwer Academic Press, March 1998

"Applications of Sampling Musical Instruments to Simulations and Virtual Environments," Invited talk at the *Acoustical Society of America Conference*, New Orleans, 1992

"Sampling Musical Instruments; Past, Present, and Future," Invited paper at the *Acoustical Society of America Conference*, New Orleans, 1992

"The Musical Intrigue of Pole-Zero Pairs," Dana Massie, Dr. Virginia L. Stonick, *ICMC92*, San Jose, 1992

“Optimal Least Squares IIR Filter Design for Music Analysis/Synthesis," Dr. Virginia L. Stonick, Dana Massie, *IEEE International Symposium on Circuits and Systems*, San Diego, CA, 1992

"ARMA Filter Design for Music Analysis/Synthesis," Dr. Virginia L. Stonick, Dana Massie, IEEE *ICASSP San Francisco*, 1992

"Engineering Study of the 4-Multiply Normalized Ladder Filter," Dana C. Massie, *91st Audio Engineering Society Convention*, New York, October 1991

Also, *Journal of the Audio Engineering Society, Vol. 41, # 7/8 July/August 1993*

"Multitasking Operating System Design for Electronic Music," Steven M. Misek, Dana C. Massie, *5th International AES Conference on Music and Digital Technology*, 1987

"Software vs. Hardware Synthesis; A Reconciliation," Dana C. Massie, Evan Brooks, *78th Convention Audio Engineering Society*, Anaheim CA, May 1985

"The Emulator II Computer Music Environment," *International Computer Music Conference*, Vancouver, B.C. 1985

Education

Cabrillo College, 1991
Music Theory

U.C. Santa Barbara, 1986 Seminar
Digital Signal Processor Architectures and Applications

George Washington University 1982
Graduate Course Work in Digital Signal Processing, Programming and Data Structures

Virginia Polytechnic Institute, 1976-1979
Electrical Engineering and Computer Science

Virginia Commonwealth University,1974-1976
Electronic Music Composition and Instrument Design

George Mason University, 1973-1974
Philosophy, Liberal Arts

Personal

Married with two kids. Enjoy movies, reading, music making and listening, swimming, and astronomy.