

CURRICULUM VITAE

Richard Hodges

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Accomplishments in Technology (selected)

Machine learning techniques in audio signal processing

High performance Noise Reduction, AEC and other algorithms for audio.

Implemented unique technology for music synthesis, and for modification of signals from guitar and other instruments.

Designed high-performance acoustic modules for microphones and speakers, with simulation (COMSOL) and verification by acoustic measurements.

Implemented innovative techniques for reducing speaker distortion by algorithmic simulation of cone excursion (patent applied for).

Conceived, patented and implemented unique acoustic configuration for speaker and microphones of a speakerphone (Plantronics). I also contributed to other technical aspects of the design including AEC and telephony standards compliance.

Represented Motorola SPS in the ISO/IEC MPEG international standards process. Involved in development of MP3 audio coding standard.

Invented a proprietary low bit rate voice coding algorithm. I managed development of products based on this algorithm through the stages of concept, prototype (hardware and software), financing, and commercialization. (ACT Networks)

Implemented numerous original technology projects:

- ultrasonic presence detection using laptop speaker & microphone
- image and signal processing: coding, noise & echo mitigation, etc.
- a new type of electronic musical instrument (US patent 3,948,138)
- hexaphonic nonlinear signal processing system for guitar
- imbedded microprocessor system for trace chemical analysis
- gyroscope-controlled 2-wheel self-balancing platform

Areas of Proven Experience

Sound and image processing, coding, and recognition algorithms

Acoustic design, simulation (using COMSOL), and measurement.

Fluid Dynamics simulation of wind noise generation and mitigation (headsets).

Initiative and advanced skills in integrated development of innovative systems, algorithms, software, digital and analog electronics, and acoustical, optical, and other technologies

Software Environments: Matlab, Simulink, C, C++, COMSOL, Lisp, Fortran,...

Patents Issued and applied for

US 3,948,138 A New Type of Musical Instrument

US 6,747,581 Techniques for Variable Sample Rate Conversion

US 7,236,929 Echo Suppression and Speech Detection Techniques

US 7,433,462 Techniques for Improving Telephone Audio Quality

US 7,925,004 Speakerphone with Downfiring Speaker & Directional Microphones

US appl. 13/458,122 Reduction of Loudspeaker Distortion for Improved AEC

Career Biography (selected)

April 2012 - Present

Principal Scientist, Synaptics (acquired my previous company Conexant Systems July 2017):
Machine learning; Audio DSP algorithms; Acoustic design, simulation, and measurement;

April 2005 - April 2012

Principal Scientist, Plantronics Inc. (acquired Octiv Inc.)

Responsible for development of acoustic design and algorithms and for speech audio:
echo mitigation, noise reduction, AEC, audio quality evaluation, etc.

Jan 2000 - April 2005

VP Technology, Octiv Inc., Berkeley CA

Responsible for oversight of all new technology including digital, analog, and
acoustical. Develop and implement new algorithms for audio signal processing and
telecommunications.

Jan 95 - Jan 2000

Senior Engineer, Orban Inc., San Leandro CA

Develop and implement advanced algorithms for audio coding and processing

Feb 94 - Dec 95

Research Technologist, Gibson USA, Berkeley CA

Develop technology for the next generation of electronic musical instruments

June 1988 - Feb 94

Technology Sales, Motorola SPS, Sunnyvale CA

Work with major strategic customers to develop next-generation silicon technology
for video compression, RF digital communication, DSP applications, and other areas

May 1985 - May 1988

VP Technology, ACT Networks, Westlake Village CA

I founded this company to develop and commercialize medium bit-rate real-time
speech coding for voice/data telecommunication applications. ACT Networks
became a publicly traded company of which I was a major stockholder.

Mar 1980 - Apr 1985

Senior Scientist, Votan, Fremont CA

Responsible for developing new technology in signal processing and artificial
intelligence for analysis, recognition, and compression of human speech.

June 1975 - Feb 1980

Senior Scientist, Teknekron, Berkeley CA

Developed hardware and software for image processing, image coding, pattern
recognition, real-time control

December 1970 - June 1975

Founder and CEO, Extended Digital Concepts, Berkeley CA

Developed and marketed biofeedback kits (EEG, EMG)

Sept 1969 - Aug 1973

Assistant Professor, EECS dept., UC Berkeley

Taught courses in Computer Science and Artificial Intelligence.

Publications

W.W. Bledsoe and Richard Hodges, "A Survey of Automatic Theorem Proving," *Proceedings of AAAI-87 (Survey Papers)*, AAAI, 1987

"The MPEG Video Compression Standard," *Computer Design*, 1993

"Drum is the Ear of God: Africa's Inner World of Music," *Material for Thought* #13, Far West Press, San Francisco 1992

"The Quick and the Dead: The Souls of Man in Vodou Thought," *Material for Thought* #14, Far West Press, San Francisco 1995

"From the Mat to the Street: Judo and Life", *Material for Thought* #15, Far West Press, San Francisco 1998

"The Way of a Tourist," *Shambala Sun* Feb/Mar 1996

Foundation Course in African Music (with C. K. Ladzekpo), a popular WWW page at <http://home.comcast.net/~dzinyaladzekpo/Foundation.html>

"Case Study: Cost-effective and rapid audio headset design and verification," *EE Times* Audio Design Line 6/22/2010

"Thus Spake Beelzebub", *Gurdjieff International Review* 2012 (online), <http://www.gurdjieff.org/hodges1.htm>

Education

Graduate Studies, Mathematics, UC Berkeley, 1964-1972

BA Mathematics, Rice University, Houston, 1960-1964

Other Accomplishments and Interests

Fourth Degree Black Belt in Judo; winner of Gold Medal at the 2009 World Masters Judo Tournament (see <http://r.hodges.home.comcast.net/~r.hodges/JudoMasters.html>)
Two-time winner of U.S. Masters National Championship

Advanced Class Amateur Radio License (KE6SO)

Percussion, Keyboard, and Woodwind musician

Amateur violin maker