Resume — Chris Heegard

Personal Information

Born October 4, 1953, Pasadena CA; citizen of USA.

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Education

9/78 - 6/81 Ph.D. in Electrical Engineering, Stanford University, Stanford, California.

6/75 - 6/76 M.S. in Electrical and Computer Engineering, University of Massachusetts, Amherst, Massachusetts.

9/71 - 6/75 B.S. in Electrical and Computer Engineering, University of Massachusetts, Amherst, Massachusetts.

Work Experience

6/01 - now Independent investor, technical consultant and expert witness, cattle rancher (Black Angus, Red Angus and Charolais) and wedding host.

9/00 - 9/02 CTO, Home and Wireless Networking, Texas Instruments, Santa Rosa, California.

1/98 - 9/00 CEO and Principal Scientist, Alantro Communications, Inc. Santa Rosa California. Alantro Communications was a fabless semiconductor company specializing in physical-layer communications with a particular expertise in forward error correction (FEC). The technology is vital in: high-speed wireless local area networking (IEEE 802.11/WiFi), cable modems, digital-tv, digital subscriber line and satellite & terrestrial wireless.

1/89 - now Founder and chief scientist for Native Intelligence, a digital communications software company.

9/81 - 12/99 Faculty, School of Electrical Engineering, Cornell University. Taught courses in analog and digital communications, error-correcting coding, information theory, detection and estimation theory, introduction to digital systems and audio engineering laboratory: an introduction to audio signal processing. Research in the areas of: turbo coding, coded modulation and trellis group codes, algebraic coding theory and algorithms, applications of symbolic computation to coding theory, magnetic and optical data recording, sequence estimation algorithms, analog source coding and data compression, audio and video signal processing, and information theory. The senior advisor of 18 graduated Ph.D. students.

2/88 - 5/88 Visiting Associate, California Institute of Technology, Pasadena, California.

9/87 - 5/88 Visiting Scientist, IBM Almaden Research Center, San Jose, California.

9/78 - 6/81 Research Assistant under the supervision of Professors Thomas Cover and Abbas El Gamal. Research in a variety of topics in coding, information theory and statistics. Ph.D. thesis titled, *Capacity and Coding for Computer Memory with Defects*. This work answers questions concerning the capacity of defective computer memory and the description of algebraic error-correcting codes for combating defects.

9/76 - 9/78 Research and Development Engineer, Linkabit Corp., 3033 Science Park Rd., San Diego, California 92121. This work involved several development projects related to satellite communications. One major project was the computer simulation and hardware implementation of a packet satellite PSK modem. The major demodulation algorithms were performed via a bipolar microprocessor with a microprogram architecture. This modem connects the ARPANET to Europe and formed the basis of a commercial product for Linkabit. A second major area of my involvement was the development of several sequential decoders for convolutional codes.

6/75 - 6/76 Research Assistant under the supervision of Professor Jack K. Wolf. This research involved the investigation of a coding scheme for the Gaussian broadcast channel.

Consulting

2011-2012 Law offices, *Covington & Burling LLP*, San Francisco, CA. Patent infringement cases: "Motorola Mobility, Inc. v. Apple, Inc." and "Apple Inc. and NeXT Software, Inc. v. Motorola, Inc. and Motorola Mobility, Inc." Expert witness for Apple; WiFi and Cellphone technology. ([CB])

2009-2011 Law offices, *Jones Day*, Washington, DC. Patent infringement cases: "Vizio, Inc., v. LG Electronics" and "Vizio, Inc., v. Funai Electric" Witness (inventor) for Vizio; Inventor on 6 of 7 patents, DTV technology. Settled. ([JD])

2009 Law offices, *Hogan & Hartson L.L.P.*, New York, NY. Patent infringement cases: "Symbol Technologies, Inc. et al. v. Aruba Networks, Inc." and "Commil USA, LLC v. Cisco Systems, Inc. et al." Expert witness for Motorola; WiFi products. ([HH])

2008 – 2009 Law offices, Law offices, *Quarles & Brady LLP*, Madison, WS. and *Faegre & Benson LLP*, Minneapolis, MN. Patent infringement case: "Fujitsu, et al. v. Netgear". Expert witness for the defendant, Netgear; WiFi products. The case was won on summary judgement. ([Q]) ([F])

2009 Law offices, *Womble Carlyle Sandridge & Rice, PLLC*, Wilmington, DL. Patent infringement case: "Rembrandt Data Technologies, LP, v. AOL LLC, et. al.". Expert witness for the plaintiff, Rembrandt; dial-up modems. ([WC])

2008 Law offices, *McDermott Will & Emery*, Washington, DC. Patent infringement case: "CIF Licensing, LLC, d/b/a GE Licensing v. Agere Systems Inc.". Expert witness for the plaintiff, GE; dial-up modems. ([MWE])

2007 - 2008 Law offices, *McDonnell, Boehnen, Hulbert & Berghoff LLP*, Chicago, IL. Patent infringement case: "Zenith Electronics Corporation v. Polaroid Corporation and Petters Group Worldwide LLC, et al,". Expert witness for the defendant, Polaroid; High Definition Television (HDTV). ([MBHB])

2005 - 2009 Law offices, *Skadden, Arps, Slate, Meagher & Flom LLP*, Palo Alto, CA and *Keker & Van Nest LLP*, San Francisco, CA. Patent infringement case: "Intel Corporation and Dell, Inc. v. Commonwealth Scientific and Industrial Research Organisation". Expert witness for plaintiff, Intel; Wireless LAN (WiFi). ([S]) ([KVN])

2004 - 2008 *WiQuest Communications Inc.*, Allen TX. Technical advisory board. Development of high performance UWB (ultra-wideband) transmission.

2005 *Keyeye Communications*, Sacramento CA. Advice on 10 Gbps Ethernet.

2003 - 2004 Law offices, *Weil, Gotshal & Manges LLP*, New York, NY. Patent infringement case: "Agere Systems, Inc. v. Broadcom Inc." Expert witness for the defendent, Broadcom; Trellis coding for cable TV. ([WEIL])

1998 - 1999 Law offices, *Irell & Manella LLP*, Century City, CA. Patent infringement case: "Stanford Telecommunications, Inc. v. Broadcom Inc.". Expert witness for defendent, Broadcom; Digital Modulator for cable TV. (I)

1997 *Aironet* – high speed wireless local area networks.

1997 *Xetron* – digital audio broadcasting on the AM band.

1997 *Aetherworks* – data modem, v.mach, development.

1996 - 1997 *Level One Communications* – data modem standards (HDSL2) development.

1996 *Next Level Communications* – data modem standards (VDSL) development.

1995 - 1996 *MarketWare Inc.* – A software FSK telephone demodulator.

1991 - 1996 *General Instrument* – The design and development of advanced, digital, cable TV transmission of "500" NTSC channels and 802.14 "cable modems".

1994 - 1995 Law offices, *Sughrue, Mion, Zinn, Macpeak & Seas*, Washington DC. Patent infringement case: "IBM vs Conners Peripheral, Inc.". Expert witness for the plaintiff, IBM; Reed-Solomon codes. (SM)

1994, 1996 *Hybrid Networks Inc.*, Cupertino, California. The development of 4-VSB cable network modem.

1993 - 1994 *Primary Access*, San Diego, California. The development of trellis coded, DSP based telephone modem v.34.

1990 - 1991 *General Instrument – VideoCipher Division*, San Diego, California. The design and development of advanced, digital, HDTV transmission system for the FCC standards competition. Designed concatenated coding system will become part of Grand Alliance standard.

1989 - 1991 *Primary Access*, San Diego, California. The development of trellis coded, DSP based telephone modems (v.32 & v.32bis).

1988 - 1991 *Codenoll Technology*, Yonkers, New York. The development and standardization of modulation and error-control for passive star, optical EtherNet based LANs.

1987 - 1990 *Imprimis*, Minneapolis, Minnesota. Modulation and coding for recording systems.

1982 - 1989 *Eastman Kodak Co.*, Rochester, New York and Spin Physics division of Kodak in San Diego. The development of high density, digital magnetic recorders.

1984 - 1985 *Anadrill - Schlumberger*, Sugarland, Texas. Modem development.

1984 *Digital Transmission Systems*, Atlanta, Georgia. Sequential decoder for binary convolutional codes.

Patents

1. Methods and apparatus for self-inverting turbo code interleaving with high separation and dispersion, *No. 7508877*, *No. 7505526* and *No. 7505525* (with John T. Coffey).
2. Separate self-synchronizing packet-based scrambler having replay variation, *No. 7,227,949* (with Richard G. C. Williams).
3. Method of increasing data rate in a wireless data communication network via clock switching, *No. 7,184,412* .
4. Reliable decision directed adaptation in a communication system employing forward error control, *No. 7,113,556* (with Stanley K. Ling).
5. Methods and apparatus for self-inverting turbo code interleaving with high separation and dispersion, *No. 7,082,168* (with John T. Coffey).
6. Phase-locked loop initialization via curve-fitting, *No. 6,993,095* (with Peter A. Murphy).
7. Joint equalization and decoding using a search-based decoding algorithm, *No. 6,961,392* (with Matthew B. Shoemake).
8. Packet binary convolutional codes, *No. 6,823,488* (with Matthew B. Shoemake).
9. Decision-directed adaptation for coded modulation , *No. 6,782,046* (with Stanley K. Ling & Eric J. Rossin).
10. Fast search-based decoding scheme, *No. 6,701,483* (with Matthew B. Shoemake & Scott Petler).
11. Variable rate constellation precoding, *No. 6,532,267* .
12. Concatenated trellis coded modulation and linear block codes, *No. 6,160,854* (with David Rowe).

13. Concatenated trellis coded modulation and linear block codes, *No. 5,790,570* (with David Rowe).

14. Randomizer for byte-wise scrambling of data, *No. 5,745,522* .

15. Synchronization and error detection in a packetized data stream, *No. 5,703,887* (with Andrew J. King, Sydney Lovely & Thomas J. Kolze).

16. Rotationally invariant trellis coding incorporating transparent binary convolutional codes, *No. 5,621,761* .

17. Quadrature amplitude modulated data for standard bandwidth television channel, *No. 5,511,096* (with Zheng Huang).

18. Punctured convolutional encoder, *No. 5,511,082* (with Stephen K. How).

19. Method and apparatus for communicating digital information such as compressed video using trellis coded QAM, *No. 5,321,725* (with Woo Paik, Scott Lery, Edward Krause & Jerrold Heller).

20. Method and apparatus for communicating digital data using trellis coded QAM, *No. 5,233,629* (with Woo Paik & Scott Lery).

21. Collision detection using code rule violations of the Manchester code, *No. 5,162,791* .