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Education

M.I.T., Master of Science, Visual Studies (Computer Graphics), 1980

M.I.T., Bachelor of Science, Computer Science, 1978

Professional Experience -- MIT

Media Laboratory, Principal Research Scientist, 1985-2018 (retired)
Director, Living Mobile Research Group (formerly Speech + Mobility)

Architecture Machine Group, Research Associate, 1980-1984

Architecture Machine Group, Research Assistant, 1979-1980

Architecture Machine Group, Graphics Programmer, 1977-1979

Departmental Undergraduate Research Opportunities Program Coordinator, 1984-2018

Laboratory Intellectual Property Committee 2001-2016, chair 2002-2009

Departmental Committee on Graduate Studies, 1996-2001, 2007-2018

Sponsored Research Activities

Alerting and Mobile Messaging, Digital Life Consortium, MIT Media Lab, 1997-2018

Acoustical Cues to Discourse Structure, National Science Foundation, Principal Investigator, 1995-1998

Parsing Radio, News in the Future Consortium, MIT Media Lab, 1993-1999

Desktop Audio, SUN Microsystems, Inc., Principal Investigator, 1989-1996

Voice Interaction in Hand Held Computers, Apple Computer, Principal Investigator, 1991-1993

Voice Interfaces for Network Services, AT&T, Principal Investigator, 1989-1991

Back Seat Driver, NEC, Principal Investigator, 1988-1991

Acoustic and Visual Cues for Speech Recognition, DARPA, co-Principal Investigator, 1986-1988

Personal Computers and Telephony, NTT Public Corporation, Principal Investigator, 1984-1989

Home Telecomputing, Atari, Inc., Principal Investigator, 1983

Samsung v. Cerence
IPR2025-00458
Exhibit 1003

Testifying legal engagments within the last five years, representing party in italics

- *Microsoft* v. SpeakWare, 2019
- *Bumble Trading LLC* v. Match Group LLC, 2019
- *Tile Inc.* v. Cellwitch Inc, 2019
- Blackberry Ltd v. *Facebook, Inc* 2020
- *EROAD Ltd* v. PerDiem Co, 2020
- *Snap Inc.* v. SRK Technology LLC, 2020
- *Shopify Inc* Ltd v. Express Mobile Inc, 2020
- Express Mobile Inc, v *Wix Ltd* 2020
- *Motorola Mobility LLC* v. Ironworks patents, LLC. 2021
- Express Mobile Inc, v *GoDaddy Inc* 2021
- *Bumble Trading LLC* v. Kinectus, LLC. 2021
- *Tile, Inc* v. Linquet Technologies, Inc. 2021
- *Facebook, Inc.* v. Palo Alto Research Center, Inc. 2021
- *Unified Patents, LLC* v.Gesture Technology Partners, LLC. 2021
- Quantum Metric, Inc v.*Content Square Isreal, Ltd.* 2021
- *Meta Platforms Inc.* v.AlmondNet, Inc 2022
- *Apple Inc.* v.Zentian Limited 2022
- *Google LLC* v. Mira Advanced Technoogy Systems Inc 2022
- *Google LLC and Youtube LLC* v. Robocast, Inc 2023
- *Google LLC* v. Adnexus 2023

Professional Experience -- Intellectual Property

Co-inventor on U.S. Patents

- 5,177,685 for "Automobile navigation system using real time spoken driving instructions"
- 6,728,348 for "System for storing voice recognizable identifiers using a limited input device such as a telephone key pad"
- 6,937,986 for "Automatic dynamic speech recognition vocabulary based on external sources of information"
- 7,098,776 for "Methods and apparatus for vibrotactile communication"
- 7,392,280 for "Method for summarization of threads in electronic mail"
- 7,738,637 "Interactive voice message retrieval"
- 7,443,283 for "Methods and apparatus for connecting an intimate group by exchanging awareness cues and text, voice instant messages, and two-way voice communications"
- 7,865,560 for "System for summarization of threads in electronic mail"
- 8,121,653 for "Methods and apparatus for autonomously managing communications using an intelligent intermediary"
- 8,135,128 for "Animatronic creatures that act as intermediaries between human users and a telephone system"

Co-inventor on U.S. Patent Applications

- 20020076009 "International dialing using spoken commands"
- 20020087328 "Automatic dynamic speech recognition vocabulary based on external sources of information"
- 20020064257 "System for storing voice recognizable identifiers using a limited input device such as a telephone keypad"
- 20030023688 "Voice-based message sorting and retrieval method"
- 20030081738 "Method and apparatus for improving access to numerical information in voice messages"

- 20030144846 "Method and system for modifying the behavior of an application based upon the application's grammar"
- 20030158903 "Calendar bar interface for electronic mail interaction"

Publications
Most publications can be found at http://www.media.mit.edu/speech/publications
or http://living.media.mit.edu/publications

Field Study of a Tactile Sound Awareness Device for Deaf and Hard of Hearing Users ISWC 2020. (with D. Jain, B. Chiu, S. Goodman, L. Findlater, J. Froehlich)

SkinMorph: Texture-Tunable On-Skin Interface Through Thin, Programmable Gel ISWC 2018. (with Cindy Kao, M. Banforth, D. Kim)

Technical Interventions to Detect, Communicate, and Deter Sexual Assault. ISWC 2017. (with Manisha Mohan)

Exploring Interactions and Perceptions of Kinetic Wearables. DIS 2017. (with Cindy Hsin-Liu Kao, D. Ajilo, O. Anilionyte, A. Dementyev, I. Choi and S. Follmer)

Leveraging User-made Predictions to Help Understand Personal Behavior. MobileHCI 2017. (with Miriam Greis, Tilman Dangler and Albrecht Schmidt)

Rovables: On-Body Robots as Mobile Wearables. UIST 2016. (with Cindy Hsin-Liu Kao, A. Dementyev, I. Choi, D. Ajilo, M. Xu, and S. Follmer)

DuoSkin: Rapidly Prototyping On-Skin User Interfaces Using Skin-Friendly Materials. ISWC 2016. (with Cindy Hsin-Liu Kao, Christian Holz, Asta Roseway, and Andres Calvo)

Immersive Terrestrial Scuba Diving Using Virtual Reality (with Dhruv Jain, Misha Sra, Jingru Go, Rodrigo Margues, Raymond Wu and Justin Chiu) Proceedings, UIST 2016

Expanding social mobile games beyond the device screen (with Misha Sra) Journal of Personal and Ubiquitous Computing, 2015

NailO: Fingernails as an input surface (with Cindy Hsin-Liu Kao, Artem Dementyev, Joseph Paradiso) CHI 2015

Mugshots: A mug display for front and back stage social interaction in the workplace (with Cindy Hsin-Liu Kao) TEI (Tangible and Embedded Interfaces) 2015

Mime: compact, low power 3D gesture sensing for interactionwith head mounted displays (with Andrea Colaco, Ahmend Kirmani, Hye Soo Yang, Nan-Wei Gong, and Vivek Goyal) Proceedings of UIST 2013.

Spotz: A location-based approach to self-awareness (with Misha Sra) Proceedings of Persuasive 2013.

Setting the stage for interaction: A tablet application to augment group discussion in a seminar class (with Drew Harry and Eric Gordon) Proceedings of CSCW 2012.

Indoor Location Sensing using Geo-Magnetism (with Jaewoo Chung, Matt Donahoe, Ig-Jae Kim, Pedram Razavai and Micaela Wiseman) Proceedings of International Conference on Mobile Systems, Applications, and Services (Mobisys) 2011.

My second bike: a TV-enabled social and interactive riding experience (with Jaewoo Chung, Kuang Xu, Andrea Colaco, and Victor Li) Proceedings of IEEE Communications and Networking Conference, Jan 2010.

Going my way?: User-aware route planner (with Jaewoo Chung) Proceedings CHI 2009.

Globetoddler: Designing for remote interataction between preschoolers and their traveling parents (with Paulina Modlitba) CHI 2008 Extended Abstracts

Are we there yet? - a temporally aware media player (with Matt Adcock and Jaewoo Chung), Australian User Interface Conference (AUIC) 2008

Physical embodiments for mobile communication agents (with Stefan Marti), UIST 2005

Giving the caller the finger: collaborative responsibility for cellphone interruptions (with Stefan Marti) Extended Abstracts, CHI 2005

Active Messenger: email filtering and delivery in a heterogeneous network (with Stefan Marti) Human-Computer Interaction Journal (HCI) Volume 20 (2005)

WatchMe: communication and awareness between members of a closely-knit group (with Natalia Marmasse) Proceedings of Ubicomp 2004

An audio-based personal memoroy aid (with S. Vemuri, W. Bender, S.Tellex and B. Lassey) Proceedings of Ubicomp 2004

Improving speech playback using time-compression and speech recognition (with Sunil Vemuri, Philip DeCamp, and Walter Bender) Proceedings of CHI 2004

Impromptu: managing networked audio applications for mobile users (with Kwan Lee, Jang Kim, and Mark Ackerman), Proceedings of MobiSys 2004

TalkBack: a conversational answering machine (with Vidya Lakshmipathy and Natalia Marmasse) Proceedings of UIST 2003

``ListenIn" to domestic environments from remote locations (with Gerardo Vallejo) Proceedings of the 2003 International Conference on Auditory Display (ICAD)

Safe & Sound: a wireless leash (with Natalia Marmasse) Extended Abstracts, Proceedings of CHI 2003

Mediated voice communication via mobile IP (with Jang Kim, Kwan Lee, Gerardo Vallejo, and Mark Ackerman), Proceedings of UIST 2002.

The Audio Notebook: Paper and pen interaction with structured speech (with Lisa Stifelman and Barry Arons), Proceedings of CHI 2001

Synthetic News Radio (with Keith Emnett) IBM Systems Journal, Vol. 39 Nos. 3-4, pp. 646-659, 2000.

Everywhere messaging (with Natalia Marmasse, Stefan Marti, Nitin Sawhney, and Sean Wheeler) IBM Systems Journal, Vol. 39 Nos. 3-4, pp. 660-677, 2000.

Location-aware information delivery wth comMotion (with Natalia Marmasse), Proceedings of the Second International Symposium on Handheld and Ubiquitous Computing, pp. 157-171, Springer, 2000.

Nomadic Radio: Scalable and contextual notification for wearable audio messaging (with Nitin Sawhney), Proceedings of CHI 1999.

Speaking and listening on the run: Design for wearable audio computing (with Nitin Sawhney), Proceedings of International Symposium on Wearable Computing, 1998.

Audio Hallway: A virtual acoustic environment for browsing, Proceedings of UIST 1998.

Dynamic Soundscape: Mapping time to space for audio browsing (with Minoru Kobayashi), Proceedings of CHI 1997.

CLUES: Dynamic personalized message filtering (with Matt Marx), Proceedings of CSCW 1996.

Using acoustic structure in a hand-held audio playback device (with Deb Roy), IBM Systems Journal, Vol 35, Nos. 3 and 4, 1996.

Mailcall: Message presentation and navigation in a nonvisual environment (with Matt Marx), Proceedings of CHI 1996

AudioStreamer: Exploiting simultaneity for listening (with Atty Mullins), short paper, CHI 1995.

Multimedia momadic services on today's hardware, IEEE Network, September/October 1994.

Putting people first: Specifying proper names in speech interfaces (with Matt Marx), proceedings of UIST 1994.

Chatter: A conversational learning speech interface (with E. Ly) AAAI Workshop on Intelligent Multi-Media Multi-Modal Systems, 1994.

Voice Communication with Computers: Conversational Systems. New York: Van Nostrand Reinhold. 1994.

Capturing, structuring, and representing ubiquitous audio (with D. Hindus and C. Horner), ACM Transactions on Information Systems, Vol. 11, No. 4, October 1993.

Speech Recognition Architectures for Multimedia Environments, (with E. Ly and B. Arons), Proceedings of the 1993 AVIOS Conference, September 1993.

Phoneshell: the Telephone as Computer Terminal, Proceedings of the ACM Multimedia Conference, August 1993.

Voicenotes: A Speech Interface for a Hand-Held Voice Notetaker (with L. Stifelman, B. Arons, and E. Hulteen), Proceedings of INTERCHI'93, April 1993.

From Desktop Audio to Mobile Access: Opportunities for Voice in Computing, book chapter in Advances in Human-Computer Interaction, Vol. 4, H.R. Hartson and D. Hix editors. 1992.

Ubiquitous Audio: Capturing Spontaneous Collaboration (with D. Hindus), Proceedings of CSCW'92, November 1992.

Integrating Audio and Telephony in a Distributed Workstation Environment (with S. Angebranndt, R. Hyde, D. Luong, and N. Siravara), Proceedings of the Summer 1991 USENIX Conference, June 1991.

Augmenting a Window System with Speech Input (with M. Ackerman and D. Hindus), Computer, IEEE Computer Society, Vol. 23, No. 8, August 1990.

Observations on Using Speech Input for Window Navigation (with D. Hindus, M. Ackerman, and S. Manandhar), Proceedings, Human-Computer Interaction, Interact '90, IFIP, August 1990.

Phonetool: Integrating Telephones and Workstations (with S. Casner), Proceedings, GLOBECOM '89, IEEE Communications Society, November 1989.

Desktop Audio (with B. Arons), UNIX Review, October 1989.

Synthetic Speech for Real Time Direction-Giving (with J. Davis), IEEE Transactions on Consumer Electronics, IEEE, September 1989.

The Back Seat Driver: Real Time Spoken Driving Instructions (with J. Davis), Proceedings, IEEE Vehicle Navigation and Information Systems Conference, IEEE, Toronto, Canada, September 1989.

An Audio and Telephone Server for Multi-media Workstations (with M. McKenna), Proceedings, Second IEEE Conference on Workstations, IEEE, Palo Alto, CA., 1988.

Employing Voice Back Channels to Facilitate Audio Document Retrieval, Proceedings, ACM Conference on Office Information Systems (COIS), Santa Clara, CA, 1988.

Conversational Telecommunications Environments, Proceedings, Second International Conference on Human-Computer Interaction, 1987.

Understanding Speech Without Recognizing Words, Proceedings, American Voice Input/Output Society Conference, AVIOS, 1987.

A Robust Parser and Dialog Generator for a Conversational Office System (with B. Arons and C. Simmons), Proceedings, American Voice Input/Output Society Conference, AVIOS, Palo Alto, CA, 1987.

Integrated Messages and Network Services for a Personal Workstation, IEEE Workshop on Telematics and Message Handling Systems, IEEE, 1986.

Voice Interaction in an Integrated Office and Telecommunications Environment, Proceedings, American Voice Input/Output Society Conference, AVIOS, San Francisco, CA, 1985.

Voice Communication with Computers, book chapter in Advances in Human-Computer Interaction, H. R. Hartson ed., 1985.

Speech Synthesis Gives Voiced Access to an Electronic Mail System, Speech Technology, Vol. 2, No. 3, Aug/Sept 1984.

A Conversational Telephone Messaging System (with B. Arons), IEEE Transactions on Consumer Electronics, IEEE, Vol CE-30, August 1984.

Phone Slave: A Graphical Telecommunications Interface (with B. Arons), Proceedings, Society for Information Display International Symposium, SID, San Francisco, CA, June 1984.

Input/Display Registration in a Stereoscopic Workstation, Displays, April 1984.

Remote Access to Voice and Text Messages, Proceedings, American Voice Input/Output Society Conference, AVIOS, Washington D.C., 1984.

Fuzzy Fonts: Analog Models Improve Digital Text Quality, Proceedings, National Computer Graphics Association Conference, Chicago, IL, 1983.

Greyscale Fonts Designed From Video Signal Analysis, Society of Applied Learning Technology, Houston, TX, 1983.

Spatial Input/Display Correspondence in a Stereoscopic Computer Graphic Work Station, Proceedings, ACM/SIGGRAPH, Detroit, MI, 1983.

A Programmable Virtual Vocabulary Speech Processing Peripheral (with W. Bender), Proceedings, American Voice Input/Output Society Conference on Voice Data Entry Systems Applications, AVIOS, 1983.

The Intelligent Voice Interactive Interface (with E. A. Hulteen), Proceedings, Human Factors in Computer Systems, National Bureau of Standards/ACM, Gaithersburg, MD, 1982.

Interactive Three-Dimensional Computer Space, Proceedings, SPIE Conference on Processing and Display of Three-Dimensional Data, SPIE, San Diego, CA, 1982, Vol. 367.

Speech Communications, a Systems' Approach, Proceedings, American Voice Input/Output Society Conference on Entry Systems Applications, 1982.

Voice Interaction: Putting Intelligence into the Interface, Proceedings, IEEE International Conference on Cybernetics and Society, IEEE, Seattle, WA, 1982.

The Intelligent Ear: A Graphical Interface to Digital Audio, Proceedings, IEEE International Conference on Cybernetics and Society, IEEE, Atlanta, GA, 1981.

Soft Typography, Information Processing 1980, IFIPS, S. Lavington ed., North-Holland Publishing Co., 1980.