

Corey I. Cheng

Curriculum Vitae

I. Contact Information

Work Address
Dolby Laboratories
100 Potrero Ave.
San Francisco, CA 94103
voice: (415)-558-0259
FAX: (415)-863-1373

Home Address
100 Lake St. #6
San Francisco, CA 94118
(415)-831-4693

Electronic Addresses
cnc@dolby.com
coreyicheng@gmail.com
http://www.eecs.umich.edu/~coreyc

II. Objective

To apply engineering, signal processing, audio, and musical skills in a creative research environment. References, transcripts, and pre-prints provided upon request.

III. Experience

- 9/01-present** **Staff Engineer, Research Division**
Dolby Laboratories, San Francisco, California.
Technical activities
- Co-designed, implemented, and tested "Dolby AAC" audio codec for release to America-on-line "Radio@AOL" service. Coordinated codec distribution among AOL, Octiv, LoudEye, and Dolby.
 - Investigated lossless compression techniques for the industry standard AC-3 (Dolby Digital) perceptual audio coder.
 - Conceived and implemented novel power estimation algorithm for audio codecs employing the Modified Discrete Cosine Transform (MDCT). U.S. and international patents pending.
 - Participated in the Dolby Coding Technologies in Network Environments (DCTN) research initiative. Researched multiple description error mitigation techniques for use with compressed, streaming audio over 802.11 wireless networks.
- Organizational / management activities
- Organized internal research department whiteboard talks.
 - Organized college recruiting trip to University of Miami with human resources department.
 - Coordinated a distance learning initiative between members of Dolby's Research Department and the Stanford Center for Professional Development.
 - As a member of the company's benchmarking subcommittee, participated in studies on best practices for purchasing non-production items, best practices for employee focal review process.
- 9/96-8/01** **Graduate Student Research Assistant**
University of Michigan, Department of Electrical Engineering and Computer Science.
Assisted Professor Gregory H. Wakefield with spatial audio and psychoacoustics research.
- 6/99-8/01** **Visiting Researcher**
Groton U.S. Naval Submarine Medical Research Laboratories (NSMRL), Groton, Connecticut.
Assisted Dr. Thomas Buell with measurement of Head-Related Transfer Functions (HRTF's).
- 5/98-8/98** **Graduate Student Research Assistant**
University of Michigan, School of Business Administration, Department of Finance.
Developed real-time audio processing software for Professors Tyler Shumway and Joshua Coval for use in the 30-year government bond futures trading pit at the Chicago Board of Trade (CBOT).
- 7/97-8/97** **Consulting DSP Engineer**
Fujitsu Ten Corporation of America, Plymouth, Michigan.
Developed an inverse filtering algorithm for equalization of automobile stereo systems.
- 5/95-8/95** **Programmer**
Dartmouth College, Hanover, New Hampshire, Department of Computer Science.
Developed C++ internet access libraries for classroom use at Dartmouth College and Duke University.
- 6/93-8/93** **Production Engineer**
Spectrum Medical Technologies, Natick, Massachusetts.
Responsible for assembly and quality assurance testing of the RD-1200 Ruby Medical Laser.
- 12/01-5/98** **Ph.D. Electrical Engineering (Systems),
M.S.E. Electrical Engineering (Systems)**
University of Michigan, Department of Electrical Engineering and Computer Science
Thesis: *Visualization, Measurement, and Interpolation of Head-Related Transfer Functions (HRTF's) with Applications in Electro-acoustic Music.*
- 5/96** **M.A. Electro-acoustic Music**
Dartmouth College, Hanover, New Hampshire
Thesis: *Wavelet Signal Processing of Digital Audio with Applications in Electro-Acoustic Music.*
- 5/94** **B.A. Physics, cum laude in General Studies**
Harvard University, Cambridge, Massachusetts
- 5/90** **High School Diploma**
Framingham North High School, Framingham, Massachusetts

IV. Education

V. Professional Service and Teaching Experience

- 11/04-present** **Guest Lecturer, City College of San Francisco**
City College of San Francisco, San Francisco, CA.
Delivered introductory lecture to undergraduates in ENGN10A: "Introduction to Engineering: The Profession"
- 10/04** **Invited Workshop Speaker, International Computer Music Conference 2004**
International Computer Music Conference 2004 (ICMC2004), Miami, FL.
Delivered introductory tutorial on AC-3 and AAC audio codecs: "Introduction to Audio Coding with Synthetic Techniques."
- 10/02-10/03** **Technical Program Chairman**
IEEE Workshop on Applications of Signal Processing to Audio and Acoustics, New York: 2003.
Managed paper solicitation and review process; corresponded with reviewers and authors, designed technical program, chose paper session chairs.
- 4/02-present** **Member, IEEE Audio and Electroacoustics Technical Committee**
Met with other committee members to discuss and vote on pertinent technical issues.
- 4/02** **Paper Session Chairman**
International Conference on Acoustics, Speech, and Signal Processing 2003 (ICASSP), Hong Kong.
Chaired paper session on "Applications to Music."
- 1/02-present** **Technical Paper Reviewer**
Reviewed paper submissions for:
- International Conference on Acoustics, Speech, and Signal Processing (ICASSP '02-'05).
 - IEEE Transactions on Speech and Audio Processing ('02)
 - Computer Music Journal ('02)
 - Journal of Sound and Vibration ('03)
 - IEEE Workshop on Applications of Signal Processing to Audio and Acoustics(WASPAA '03)
 - Audio Engineering Society Convention ('04)
- 3/00** **Panel Discussion Coordinator and Chair**
Society for Electro-Acoustic Music in the United States (SEAMUS) Conference, Denton, TX: 2000.
Recruited members, moderated discussion: "The Aesthetic and the Exact: A Collaborative Discussion on Spatialization Between Young Composers and Young Scientists in Electro-acoustic Music."
- 1/01-5/01** **Teaching Assistant**
University of Michigan, Department of Electrical Engineering and Computer Science.
Lab Instructor for EECS210, Electrical Engineering I.
- 9/99** **Paper Session Co-Chair**
Audio Engineering Society (AES) 107th Convention, New York: 2000.
Co-chaired and selected papers for a paper session at AES107/New York.
- 5/88-8/88** **Volunteer Computer Instructor**
Framingham Public School Systems, Framingham, Massachusetts.
Taught elementary BASIC programming to K-6 summer school students.

VI. Awards

- 7/01** **Outstanding Paper by a Young Presenter In Signal Processing**
141st meeting of the Acoustical Society of America, Chicago, IL
"Error analysis of HRTF's measured with complementary (Golay) codes."
- 9/00-9/01** **Graduate Assistantships in Areas of National Need (GAANN) Fellow**
U.S. Department of Education
University of Michigan, Ann Arbor, Michigan, Dept. of Electrical Engineering and Computer Science
- 9/94-5/96** **Graduate Student Fellowship**
Dartmouth College, Hanover, New Hampshire, Department of Music
Tuition and stipend awarded for duration of M.A. degree program.
- 5/93** **Ford Undergraduate Research Grant**
Harvard University, Cambridge, Massachusetts
This grant was used to study MIDI (Musical Instrument Digital Interface) hardware interfacing.
- 9/92-5/94** **Harvard College Honorary Scholarship**
Harvard University, Cambridge, Massachusetts
This Honorary Scholarship is given based on a Group II academic ranking.
- 5/90** **National Finalist, 49th annual Westinghouse Science Talent Search**
Science Talent Institute, Washington, D.C. Research Paper: "A Derivation of the Pythagorean Theorem: Simple Harmonic Motion and Pythagorean Triples Revisited."
- 5/90** **Donald St. Andre Mathematics Award**
Framingham North High School, Framingham, Massachusetts
This honorary scholarship is given to the top mathematics student at Framingham North High School.
- 5/90** **Tandy Technology Scholars Scholarship**
TAB (regional newspaper), Framingham, Massachusetts
This award is an honorary scholarship for technically-oriented high-school students.

VII. Technical Publications, Musical Recordings

- Cheng, Corey I. "Method for Estimating Magnitude and Phase in the MDCT Domain." Audio Engineering Society (AES) 116th Convention, Berlin, Germany: 2004.
- Cheng, Corey I. and Wakefield, Gregory H. "Analysis of DC effects on HRTF's measured with Golay Codes: DC blocking Golay codes." 2003 IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA03): October, 2003.
- Cheng, Corey I. *Visualization, Measurement, and Interpolation of Head-Related Transfer Functions (HRTF's) with Applications in Electro-acoustic Music*. Ph.D. thesis, University of Michigan Dept. of Electrical Engineering and Computer Science: August 2001.
- Cheng, Corey I. and Wakefield, Gregory H. "Error Analysis of HRTF's measured with Complementary (Golay) codes." *Abstracts of the Acoustical Society of America* **109**: 141st meeting, Chicago IL.
- Cheng, Corey I. and Wakefield, Gregory H. "Introduction to Head-Related Transfer Functions (HRTF's): Representations of HRTF's in Time, Frequency, and Space." *Invited Paper. Journal of the Audio Engineering Society (AES)* **49**(4): April 2001..
- Cheng, Corey I. and Wakefield, Gregory H. "Moving sound source synthesis for binaural electro-acoustic music using interpolated Head-Related Transfer Functions (HRTF's)." *Invited Paper. Computer Music Journal* **25**(4): Winter 2001.
- Cheng, Corey I. *Fishbowl*, a binaural musical composition for tape, with accompanying demonstrations of binaural composition techniques. *Computer Music Journal Compact Disc*, **25**: 2001.
- Cheng, Corey I. and Wakefield, Gregory H. "Moving sound source synthesis for binaural electro-acoustic music using interpolated Head-Related Transfer Functions (HRTF's)." *Sound In Space Symposium*, Center for Research in Electronic Art Technology (CREATE), University of California at Santa Barbara: 2000.
- Cheng, Corey I. *Fishbowl*, a musical composition for tape. Presented at the 2000 Society for Electro-Acoustic Music in the United States (SEAMUS) National Conference, Denton, Texas: 2000.
- Cheng, Corey I. and Wakefield, Gregory H. "A Tool for Volumetric Visualization and Sonification of Head-Related Transfer Functions (HRTF's)." International Conference on Auditory Display (ICAD), Atlanta, Georgia: 2000.
- Cheng, Corey I. and Wakefield, Gregory H. "Introduction to Head-Related Transfer Functions (HRTF's): Representations of HRTF's in Time, Frequency, and Space." *Invited Tutorial. Audio Engineering Society (AES) 107th Convention*, New York: 1999.
- Cheng, Corey I. and Wakefield, Gregory H. "Spatial Frequency Response Surfaces: An Alternative Visualization Tool for Head-Related Transfer Functions (HRTF's)." *International Conference on Acoustics, Speech, and Signal Processing (ICASSP99)*, Phoenix, Arizona: 1999.
- Cheng, Corey I. and Wakefield, Gregory H. "Spatial Frequency Response Surfaces (SFRS's): An Alternative Visualization and Interpolation Technique for Head-Related Transfer Functions (HRTF's)." *AES (Audio Engineering Society) 16th International conference on spatial sound reproduction*, Rovaniemi, Finland: 1999.
- Cheng, Corey I. "High Frequency compensation of low sample-rate audio files: A Wavelet-based spectral excitation algorithm." *Proceedings of the 1997 International Computer Music Conference (ICMC '97)*, Thessaloniki, Greece: 1997.
- Cheng, Corey I. *Woods*, a musical composition for tape. Presented at the 1997 International Computer Music Conference (ICMC '97), Thessaloniki, Greece, 1997.
- Cheng, Corey I. *Woods*. *1997 International Computer Music Conference Compact Disc*, Thessaloniki, Greece, 1997.
- Cheng, Corey I. *Wavelet signal processing of digital audio with applications in electro-acoustic music*. Masters thesis, Dartmouth College, Hanover, NH: 1996.
- Cheng, Corey I. *Fantasy for Viola and Tape*, a musical composition for live viola and recorded tape. Presented at the 1996 International Computer Music Conference (ICMC '96), Hong Kong, 1996.
- Cheng, Corey I. "A Derivation of the Pythagorean Theorem," *New England Journal of Mathematics*, 1990.

VIII. Patents

- Cheng, Corey I. et al. "Improved coding techniques using estimated spectral magnitude and phase derived from MDCT coefficients." Allowance of U.S. application 10/766,681 on 18 Apr 2005. International patents pending.

IX. Skills and Interests

- Skills:** C/C++ programming in PC/UN*X environments; MATLAB programming; working knowledge of assembly language programming; basic audio engineering, sound synthesis, and sound processing skills; working knowledge of Linux system administration, oral presentation experience.
- Foreign Languages:** Second-year college level Mandarin Chinese; working knowledge of Spanish.
- Musicianship:** Violinist and violist. Working knowledge of piano and guitar.
- Long-term Travel:** Beijing, China (Princeton in Beijing / 3 months); Taipei Taiwan (3 months / "Love Boat"); Hong Kong (4 years).
- Ballroom Dancing:** University of Michigan Ballroom Dance Team.
- Volleyball:** Dolby Laboratories Volleyball Team.