

# Hwan Shim, Ph.D.

3353 Alma St. Apt. 245, Palo Alto, CA, 94306

Phone: 650-714-3169

Email: hwanshim@ccrma.stanford.edu

## Area of expertise

- Sound reproduction - wave field synthesis, binaural reproduction, home theater, car audio system
- Sound source separation - stereo music source separation, up-mix algorithms
- Array techniques - loudspeaker array for sound reproduction, microphone array for analyzing reflections
- Audio codec - Perceptual audio coding
- Digital audio effects - artificial reverberator, dynamic processors

## Education

SEOUL NATIONAL UNIVERSITY, Seoul, Korea Mar.2003-Aug.2008

- *Ph.D., Electrical Engineering, Aug. 2008*
- Primary Area: *Acoustics and Audio Signal Processing*
- Thesis: *Sound Field Reproduction using Wave Field Synthesis and Discrete Surround*
- Advisor: Prof. Dr.-Ing. Koeng-Mo Sung

SEOUL NATIONAL UNIVERSITY, Seoul, Korea Mar.1996-Feb.2003

- *B.S., Electrical Engineering, Feb. 2003*

## Working Experience

CCRMA, STANFORD UNIVERSITY, Stanford, CA Sep.2008-present

- Visiting Scholar (Postdoc position) in CCRMA (Center for Computer Research in Music and Acoustics)
- Research on up-mix algorithms and sound source separation
  - Implemented 3-D up-mixer using sound source separation

APPLIED ACOUSTICS LAB., SEOUL NATIONAL UNIVERSITY, Seoul, Korea Mar.2003-Aug.2008

- Development of sound reproduction system using **Wave Field Synthesis**
  - Collaborated with **ETRI** (Electronics and Telecommunications Research Institute)
  - Developed loudspeaker array techniques, reverberation algorithms and authoring software for wave field synthesis
- Development of **Sound field reproducing algorithm** for home theater system
  - Collaborated with **Samsung**
  - Implemented measuring system for analyzing reflections and sound field reproducing techniques
  - Measured reflections from several halls
- Research on **Distance Perception and Spaciousness** for 3D audio system
  - Collaborated with ETRI (Electronics and Telecommunications Research Institute)
  - Implemented artificial reverberators

REPUBLIC OF KOREA AIR FORCE, Chungcheongbuk, Korea Mar.1998-Sep.2000

- Airman first class, Republic of Korea Air Force Academy

## Teaching Experience

DONG-AH INSTITUTE OF MEDIA AND ARTS, Kyungki, Korea

Sep.2005-Dec.2007

- **Lecturer**, Department of Broadcasting Engineering
- Course: **Fundamental acoustics, Digital signal processing, Sound recording and mixing**

SEOUL NATIONAL UNIVERSITY, Seoul, Korea

Mar.2003-Feb.2005

- Teaching Assistant, Seoul National University
- Course: Acoustics, Applied Acoustics, Ultrasonics, Musical Acoustics
- Instructor: Prof. Dr.-Ing. Koeng-Mo Sung

## Publications

1. **Hwan Shim**, Jonathan Abel, Koeng-Mo Sung, "Stereo Music Source Separation For 3D Upmixing" Accepted to *Audio Engineering Society Convention Preprint*, Oct. 2009.
2. **Hwan Shim**, Jeong-Hun Seo, Koeng-Mo Sung, "Artificial Reverberator with Location Control in Multi-channel Recording," *Audio Engineering Society Convention Preprint*, May. 2007.
3. Hyunjoo Chung, **Hwan Shim**, Jun-Seok Lim, Koeng-Mo Sung, Jae Hyoun Yoo, "Hybrid sound field processing for wave field synthesis system," *Audio Engineering Society Convention Preprint*, May. 2007.
4. Jeong-Hun Seo, Lae-Hoon Kim, **Hwan Shim**, Koeng-Mo Sung, "Research on widening the virtual listening space in automotive environment," *Audio Engineering Society Convention Preprint*, May. 2007.
5. **Hwan Shim**, Sin-lyul Lee, Sang Bae Chon, Koeng-Mo Sung, "Sound Field Processing System using Grouped Reflections Algorithm for Home Theater Systems," *IEEE Transactions on Consumer Electronics*, May 2006.
6. **Hwan Shim**, Lae-Hoon Kim, Koeng-Mo Sung, "Complex Fractional-Octave Smoothing Using Constant Bandwidth Filtering," *Conference Proceeding of Korea Acoustical Society*, pp. 627-630, July 2003.

## Patents

1. J.-H. Yoo, **H. Shim**, H. Chung, J.-S. Lim, T.-J. Lee, T.-Y. Jang, K.-M. Sung, K. Kang, J.-W. Hong, J.-W. Kim, C. Ahn, "Sound Field Reproduction Apparatus and Method for Reproducing Reflections," *US Patent Application*, filed in May 1. 2008.
2. J.-H. Yoo, T.-Y. Jang, **H. Shim**, H. Chung, J.-S. Lim, K.-M. Sung, T.-J. Lee, K. Kang, J.-W. Kim, C. Ahn, "Apparatus and Method for Reproducing Surround Wave Field Using Wave Field Synthesis," *US Patent Application*, filed in July 8. 2008.
3. J.-H. Yoo, **H. Shim**, H. Chung, J.-H. Seo, C. Kim, J. Seo, K. Kang, J.-W. Kim, C. Ahn, J.-W. Hong, K.-M. Sung, "Method and Devices of Reproducing Sound Field through Frontal Loudspeaker Array," *KR Patent Application*, filed in April 18. 2008.
4. J.-H. Yoo, **H. Shim**, H. Chung, J.-S. Lim, T.-J. Lee, T.-Y. Jang, K.-M. Sung, K. Kang, J.-W. Hong, J.-W. Kim, C. Ahn, "Apparatus and Method for Surround Soundfield Reproduction for Reproducing Reflection," *KR Patent Application*, filed in Nov. 30. 2007.
5. J.-H. Yoo, **H. Shim**, H. Chung, J.-S. Lim, T.-J. Lee, T.-Y. Jang, K.-M. Sung, K. Kang, J.-W. Hong, J.-W. Kim, "Method and Devices for Surround Soundfield Reproduction Technique using Multiple Channel Loudspeaker Array," *KR Patent Application*, filed in May 4. 2007.
6. J.-H. Yoo, I. Jang, J. Seo, **H. Shim**, H. Chung, J.-H. Seo, K. Kang, J. W. Kim, C. Ahn, "Method and Apparatus of WFS Reproduction to Reconstruct the Original Sound Scene in Conventional Audio Formats," *KR Patent Application*, filed in Dec. 14. 2007.

## SKILLS

- Programming language: Matlab, C/C++ , Java, Python
- Sound Recording Tool: ProTools, Cubase, WaveLab

## **AFFILIATIONS**

- Associate Member, Audio Engineering Society(AES)
- Engineer, composer and vocalist in a rock band named Casual Visit which has released 2 EP albums
- Co-Founder, President of FUZE, a College Band Club at Seoul National University (1997)

## **REFERENCES**

Available upon request

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