Minje Kim

2805 E. 10th St. Smith Research Center Rm 152E, Bloomington, IN 47408
+1 (812) 856-3675 minje@indiana.edu http://minjekim.com

1. POSITIONS HELD

Indiana University, Bloomington, IN
- Assistant Professor — Aug. 2016 — present
  School of Informatics, Computing, and Engineering
  + Department of Intelligent Systems Engineering (home department)
  + Data Science Program

Adobe Research, San Francisco, CA
- Research Intern — Summers in 2012, 2013, 2014, and 2015
  Creative Technologies Lab

University of Illinois at Urbana-Champaign
- Research Assistant — Fall 2011 — Spring 2015 (except Fall 2014)
  Department of Computer Science
- Teaching Assistant — Fall 2014, Fall 2015, Spring 2016
  Department of Computer Science

ETRI (A National Lab in Korea), Daejeon, Korea
- Researcher — Feb. 2006 — Jun 2011
  Audio Research Team

POSTECH, Pohang, Korea
- Research Assistant — Spring 2004 — Fall 2005 (except Fall 2004)
  Department of Computer Science and Engineering
- Teaching Assistant — Fall 2004
  Department of Computer Science and Engineering

2. EDUCATION

Ph.D. in Computer Science — May. 2016
- University of Illinois at Urbana-Champaign
- Committee: Paris Smaragdis (Advisor), Rob A. Rutenbar, Mark Hasegawa-Johnson, Gautham Mysore
- Dissertation: "Audio Computing in the Wild: Frameworks for Big Data and Small Computers"

M.S. in Computer Science and Engineering, *Summa Cum Laude* — Feb. 2006
- POSTECH, Pohang, Korea
- Advisor: Seungjin Choi
- Thesis: "Monaural Music Source Separation: Nonnegativity, Sparseness, and Shift-Invariance"

B.E. in Information and Computer Engineering, *Honor* — Feb. 2004
- Ajou University, Suwon, Korea

3. RESEARCH FUNDING

Intel Corporation ($90K) — Jan. 2018 — Dec. 2018
- Title: "Bitwise Machine Learning for Efficient AI Engines Running in the IoT Edge Devices"
- Principal Investigator

Korean Ministry of Science, ICT and Future Planning — Jan. 2017 — Dec. 2021
($1.75M in total; IU's portion is $330K)

- Title: "Research on Audio Signal Analysis/Synthesis Technology Based on Machine Learning"
- Principal Investigator
- In collaboration with ETRI

Synaptics Inc. ($75K) Aug. 2017 — Aug. 2018
- Title: "To Tackle Heterogeneity in Real-World Audio Processing Tasks by Using Collaborative Machine Learning Models"
- Principal Investigator

Intel Corporation ($90K) Jan. 2017 — Dec. 2017
- Title: "Bitwise Deep Recurrent Neural Networks for Efficient Context-Aware Pervasive Systems"
- Principal Investigator

4. HONORS, AWARDS & FELLOWSHIPS

Outstanding Teaching Assistant Fall 2015
- Dept. of Computer Science, UIUC, for the class "Machine Learning for Signal Processing (CS598PS)"

Finalist for the Best Student Papers on Audio Signal Processing Jul. 2015
- For the paper published in LVA/ICA 2015 [C023]

Qualcomm Innovation Fellowship 2015 Finalist Dec. 2014
- 35 finalists out of 146 submitted proposals from 18 participating universities

Starkey Signal Processing Research Student Grant Apr. 2014
- For the paper published in ICASSP 2014 [C017]

Intel PhD Fellowship Finalist Feb. 2014
- One of six nominees to represent the University of Illinois in the national competition

Microsoft Research PhD Fellowship Nominee Oct. 2013
- Selected as one of three applicants to represent the Dept. of Computer Science in the University of Illinois

Google ICASSP Student Travel Grant and AASP Best Student Paper Jun. 2013
- For the paper published in ICASSP 2013 [C012]

Richard T. Cheng Endowed Fellowship Aug. 2011 — Jul. 2012
- As an exceptional incoming student, Dept. of Computer Science, UIUC ($9,999)

Summa Cum Laude Feb. 2006
- POSTECH

Graduate with Honor Feb. 2004
- Ajou University

Full Scholarship for the four years of the undergraduate study Mar. 2000 — Feb. 2004
- As the departmental top-scored student in the university entrance exam

5. TEACHING

Teaching Courses
- "Machine Learning for Signal Processing" (ENGR-E 599, ISE IUB), Fall 2017
- "Machine Learning for Signal Processing" (ENGR-E 599, ISE IUB), Spring 2017

Teaching Assistant
- "Probability in Computer Science (CS361)," Dept. of Computer Science, UIUC, Spring 2016
- "Machine Learning for Signal Processing (CS598PS, CS598PSO)," Dept. of Computer Science, UIUC, Fall 2015 **[Outstanding Teaching Assistant Award]**
- "Machine Learning for Signal Processing (CS598PS)," Dept. of Computer Science, UIUC, Fall 2014
- "Automata and Formal Languages," POSTECH, Fall 2004

6. ADVISING

PhD Advisees

PhD Candidates

- Sanna Wager (Informatics at IUB)

PhD Students

- Lijiang Guo (ISE at IUB)
- Mrinmoy Maity (CS at IUB)
- Kai Zhen (CS at IUB)
- Aswin Sivaraman (ISE at IUB)

PhD Dissertation Committee

- Jerome Mitchell (CS at IUB)
- Liang Chen (Informatics at IUB)
- Supun Kamburugamuve (CS at IUB)
- Yucong Jiang (Informatics at IUB)

PhD Advisory Committee (Before the Qualifying Exam)

- Xuan Dong (CS at IUB)
- Tyler Balson (ISE at IUB)
- Pulasthi Supun Wickramasinghe (CS at IUB)
- Vibhatha Abeykoon (ISE at IUB)

Independent Study

- Aswin Sivaraman (ISE at IUB): “Psychoacoustic Models and Neural Networks," Fall 2017
- Lijiang Guo (ISE at IUB): “Bitwise Source Separation," Fall 2017
- Sun Woo Kim (CS at IUB): “End-to-end models,” Fall 2017
- Mrinmoy Maity (CS at IUB): “Efficient Hashing,” Fall 2017
- Kai Zhen (CS at IUB): “Psychoacoustic Models and Neural Networks," Fall 2017
- Brahmendra Sravan Kumar Patibandla (Data Science at IUB): "LSTM autoencoders," Summer 2017
- Vibhatha Abeykoon (ISE at IUB): "Denoising autoencoders," Spring 2017
- Sanna Wager (Informatics at IUB): "Dereverberation in the multi-channel environment," Spring 2017
- Sanna Wager (Informatics at IUB): "Concatenative Sound Synthesis," Fall 2016
- Mrinmoy Maity (CS at IUB): "Bitwise Recurrent Neural Networks," Fall 2016, Spring 2017
- Lijiang Guo (ISE at IUB): "Hashing-based fully bitwise source separation," Spring 2017
- Lijiang Guo (ISE at IUB): "Deep Learning and Parallel Computing," Fall 2016
- Zhaozhi Zhang (ISE at IUB): Coursework advisor, Fall 2016

Mentoring Undergraduate Thesis Research at UIUC

- Aswin Sivaraman: "Quantization Error Tolerance in Hashed Audio Spectra," Fall 2014 – Spring 2015
- Vinay Maddali: "Multichannel Audio Source Separation Using Probabilistic Latent Component Sharing," Fall 2012 – Spring 2013
- Igor Fedorov: "Timbre Exchange Among Speakers Using Source-Filter Model," Fall 2011 – Spring 2012

7. PROFESSIONAL ACTIVITIES

Journal Reviewer

- IEEE/ACM Transactions on Audio, Speech, and Language Processing
- IEEE Transactions on Neural Networks and Learning Systems
- IEEE Transactions on Signal Processing
- IEEE Signal Processing Letters
- The Journal of the Acoustical Society of America (JASA)
- Elsevier Neurocomputing

- Elsevier Signal Processing
- Elsevier Speech Communication

Conference Reviewer and PC Member

- Neural Information Processing Systems (NIPS)
- Association for Advances in Artificial Intelligence (AAAI) Conferences on Artificial Intelligence
- IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)
- IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)
- Asian Conference on Machine Learning (ACML)
- The International Society for Music Information Retrieval Conference (ISMIR)
- European Signal Processing Conference (EUSIPCO)
- Digital Audio Effects (DAFx)
- Joint Conference of Workshops on Statistical and Perceptual Audition and Speech Communication with Adaptive Learning (SAPA-SCALE)
- IEEE Global Conference on Signal and Information Processing (GlobalSIP)

Conference Session (Co-)Chair

- (Co-chair) IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), "AASP-L3: Deep Learning for Source Separation and Enhancement I"

Technical Committee

- IEEE Audio and Acoustic Signal Processing Technical Committee; Member

Member of IEEE and IEEE Signal Processing Society

- Since 2012

8. PUBLICATION

International Journal Articles

[J005] Hongwei Wang, Yunlong Gao, Shaohan Hu, Shiguang Wang, Renato Mancuso, ***Minje Kim***, Poliang Wu, Lu Su, Lui Sha, and Tarek Abdelzaher, "On Exploiting Structured Human Interactions to Enhance Sensing Accuracy in Cyber-physical Systems," *ACM Transactions on Cyber-Physical Systems*, vol. 1, no. 3, article 16, pp. 16:1-16:19, Jul. 2017.

[J004] Po-Sen Huang, ***Minje Kim***, Mark Hasegawa-Johnson, and Paris Smaragdis, "Joint Optimization of Masks and Deep Recurrent Neural Networks for Monaural Source Separation," *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, vol. 23, no. 12, pp. 2136-2147, Dec. 2015.

[J003] ***Minje Kim*** and Paris Smaragdis, "Mixtures of Local Dictionaries for Unsupervised Speech Enhancement," *IEEE Signal Processing Letters*, vol. 22, no. 3, pp. 288-292, Mar. 2015
(Also presented in ICASSP 2015).

[J002] ***Minje Kim***, Jiho Yoo, Kyeongok Kang and Seungjin Choi, "Nonnegative Matrix Partial Co-Factorization for Spectral and Temporal Drum Source Separation," *IEEE Journal of Selected Topics in Signal Processing*, vol. 5, no. 6, pp. 1192-1204, Oct. 2011.

[J001] Seungkwon Beack, Taejin Lee, ***Minje Kim***, and Kyeongok Kang, "An Efficient Time-Frequency Representation for Parametric-Based Audio Object Coding," *ETRI Journal*, vol. 33, no. 6, pp. 945-948, Dec. 2011.

Refereed International Conference Proceedings

[C027] Lei Jiang, ***Minje Kim***, Wujie Wen and Danghui Wang, " XNOR-POP: A Processing-in-Memory Architecture for Binary Convolutional Neural Networks in Wide-IO2 DRAMs," In Proc. *IEEE/ACM International Symposium on Low Power Electronics and Design (ISLPED)*, Taipei, Taiwan, July 24-26, 2017.

[C026] ***Minje Kim***, "Collaborative Deep Learning for Speech Enhancement: A Run-Time Model Selection Method Using Autoencoders," In Proc. *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, New Orleans, LA, March 5-9, 2017.

[C025] Sanna Wager, Liang Chen, ***Minje Kim***, and Christopher Raphael, "Towards Expressive Instrument Synthesis Through Smooth Frame-By-Frame Reconstruction: From String To Woodwind," in Proc. *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, New Orleans, LA, March 5-9, 2017.

[C024] ***Minje Kim*** and Paris Smaragdis, "Efficient Neighborhood-Based Topic Modeling for Collaborative Audio Enhancement on Massive Crowdsourced Recordings," In Proc. *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Shanghai, China, March 20-25, 2016.

[C023] ***Minje Kim*** and Paris Smaragdis, "Adaptive Denoising Autoencoders: A Fine-tuning Scheme to Learn from Test Mixtures," In Proc. *International Conference on Latent Variable Analysis and Signal Separation (LVA/ICA)*, Liberec, Czech Republic, August 25-28, 2015.
[Nominated for the Best Student Paper on Audio Signal Processing]

[C022] ***Minje Kim***, Paris Smaragdis, and Gautham J. Mysore, "Efficient Manifold Preserving Audio Source Separation Using Locality Sensitive Hashing," In Proc. *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Brisbane, Australia, April 19-24, 2015.

[C021] Yunlong Gao, Shaohan Hu, Renato Mancuso, Hongwei Wang, ***Minje Kim***, Poliang Wu, Lu Su, Lui Sha, and Tarek Abdelzaher, "Exploiting Structured Human Interactions to Enhance Estimation Accuracy in Cyber-physical Systems," In Proc. *International Conference on Cyber-Physical Systems (ICCPS)*, Seattle, WA, April 14-16, 2015.

[C020] ***Minje Kim*** and Paris Smaragdis, "Efficient Model Selection for Speech Enhancement Using a Deflation Method for Nonnegative Matrix Factorization," In Proc. *IEEE Global Conference on Signal and Information Processing (Global SIP)*, Atlanta, GA, December 3-5, 2014.

[C019] Po-Sen Huang, ***Minje Kim***, Mark Hasegawa-Johnson, and Paris Smaragdis, "Singing-Voice Separation From Monaural Recordings Using Deep Recurrent Neural Networks," In Proc. *International Society for Music Information Retrieval Conference (ISMIR)*, Taipei, Taiwan, Oct. 27-31, 2014.

[C018] Ding Liu, Paris Smaragdis, and ***Minje Kim***, "Experiments on Deep Learning for Speech Denoising," In Proc. *Annual Conference of the International Speech Communication Association (Interspeech)*, Singapore, September 14-18, 2014.

[C017] Po-Sen Huang, ***Minje Kim***, Mark Hasegawa-Johnson, and Paris Smaragdis, "Deep Learning for Monaural Speech Separation," In Proc. *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Florence, Italy, MAY 4-9, 2014.
[Winner of the Starkey Signal Processing Research Student Grant]

[C016] Johannes Traa, ***Minje Kim***, Paris Smaragdis, "Phase and Level Difference Fusion for Robust Multichannel Source Separation," In Proc. *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Florence, Italy, MAY 4-9, 2014.

[C015] Paris Smaragdis and ***Minje Kim***, "Non-Negative Matrix Factorization for Irregularly-Spaced Transforms," In Proc. *IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, New Paltz, NY, Oct. 20 – 23, 2013.

[C014] ***Minje Kim*** and Paris Smaragdis, "Single Channel Source Separation Using Smooth Nonnegative Matrix Factorization with Markov Random Fields," In Proc. *IEEE International Workshop on Machine Learning for Signal Processing (MLSP)*, Southampton, UK, Sep. 22 – 25, 2013.

[C013] ***Minje Kim*** and Paris Smaragdis, "Manifold Preserving Hierarchical Topic Models for Quantization and Approximation," In Proc. *International Conference on Machine Learning (ICML)*, Atlanta, Georgia, Jun. 16 – 21, 2013.

[C012] ***Minje Kim*** and Paris Smaragdis, "Collaborative Audio Enhancement Using Probabilistic Latent Component Sharing," In Proc. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Vancouver, Canada, May 26 – 31, 2013.
[Winner of the Google ICASSP Student Travel Grant]
[Best Student Paper Award in the Audio and Acoustic Signal Processing (AASP) area]

[C011] C. Zhang, G.G. Ko, J.W. Choi, S.-N. Tsai, ***Minje Kim***, A.G. Rivera, R. Rutenbar, P. Smaragdis, M.S. Park, V. Narayanan, H. Xin, O. Mutlu, B. Li, L. Zhao, M. Chen, and R. Iyer, "EMERALD: Characterization of Emerging Applications and Algorithms for Low-power Devices," In Proc. *IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS)*, Austin, TX, Apr. 21 – 23, 2013.

[C010] ***Minje Kim***, Paris Smaragdis, Glenn G. Ko, and Rob A. Rutenbar, "Stereophonic Spectrogram Segmentation Using Markov Random Fields," In Proc. *IEEE International Workshop on Machine Learning for Signal Processing (MLSP)*, Santander, Spain, Sep. 23 – 26, 2012.

[C009] ***Minje Kim***, Seungkwon Beack, Keunwoo Choi and Kyeongok Kang, "Gaussian Mixture Model for Singing Voice Separation from Stereophonic Music," In Proc. *Audio Engineering Society 43th Conference (AES Conference)*, Pohang, Korea, Sep. 29 – Oct. 1, 2011.

[C008] ***Minje Kim***, Jiho Yoo, Kyeongok Kang and Seungjin Choi, "Blind Rhythmic Source Separation: Nonnegativity and Repeatability," In Proc. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Dallas, TX, Mar. 14 – 19, 2010.

[C007] Jiho Yoo, ***Minje Kim***, Kyeongok Kang and Seungjin Choi, "Nonnegative Matrix Partial Co-Factorization for Drum Source Separation," In Proc. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Dallas, TX, Mar. 14 – 19, 2010.

[C006] ***Minje Kim***, Seungkwon Beack, Taejin Lee, Daeyoung Jang and Kyeongok Kang, "Segmented Dimensionality Reduction Coding on Frequency Domain Signal," In Proc. *Audio Engineering Society 34th Conference (AES Conference)*, Jeju Island, Korea, Aug. 28 – 30, 2008.

[C005] ***Minje Kim***, Minsik Park, Seung-jun Yang, Ji Hoon Choi and Han-kyu Lee, "System Aspects of TV-Anytime Metadata Codec in a Uni-directional Broadcasting Environment," In Proc. *IEEE International Symposium on Consumer Electronics (ISCE)*, Dallas, TX, Jun. 20 – 23, 2007.

[C004] Seung-jun Yang, Jung Won Kang, Dong-San Jun, ***Minje Kim***, and Han-kyu Lee, "TV-Anytime Metadata Authoring Tool for Personalized Broadcasting Services," In Proc. *IEEE International Symposium on Consumer Electronics (ISCE)*, Dallas, TX, Jun. 20-23, 2007.

[C003] ***Minje Kim*** and Seungjin Choi, "ICA-based Clustering for Resolving Permutation Ambiguity in Frequency-Domain Convolutive Source Separation," In Proc. *IEEE International Conference on Pattern Recognition (ICPR)*, Hong Kong, Aug. 20 – 24, 2006.

[C002] ***Minje Kim*** and Seungjin Choi, "Monaural Music Source Separation: Sparseness, Nonnegativity and Shift-invariance," In Proc. *International Conference on Latent Variable Analysis and Signal Separation (LVA/ICA)*, pp. 617-624, Charleston, SC, Mar. 5 – 8, 2006. (LNCS 3889).

[C001] ***Minje Kim*** and Seungjin Choi, "On Spectral Basis Selection for Single Channel Polyphonic Music Separation," In Proc. *International Conference on Artificial Neural Networks (ICANN)*, Warsaw, Poland, Sep. 11 – 15, 2005. (LNCS 3697).

The Other Papers

[M002] ***Minje Kim*** and Paris Smaragdis, "Bitwise Neural Networks," *International Conference on Machine Learning (ICML) Workshop on Resource Efficient Machine Learning*, Lille, France, Jul. 6-11, 2015

[M001] ***Minje Kim*** and Paris Smaragdis, "Collaborative Audio Enhancement: Crowdsourced Audio Recording," *Neural Information Processing Systems (NIPS) Workshop on Crowdsourcing and Machine Learning*, Montreal, Canada, Dec. 8-13, 2014

9. SELECTED TALKS & POSTERS

- [Invited Talk] Int'l Conf. on Parallel Architectures and Compilation Techniques (PACT) Workshop on Computational Intelligence and Soft Computing (CISC 2017), Sep. 10, 2017
- Intel Labs., Hillsboro, OR, Aug. 16, 2017
- CRC Human Computer Interaction Committee Academic Project Review, Intel Corp., Hillsboro, OR, Aug. 16, 2017
- Midwest Music and Audio Day, Northwestern University, Evanston, IL, Jun. 23, 2017

- Applied Research Institute Sensor Fusion Workshop, Indiana University, Bloomington, IN, Jun. 2, 2017
- Indiana University Bloomington/Bielefeld University Cognitive Interaction Technology Workshop, Indiana University, Bloomington, IN, May 17, 2017
- IBM CIO's visit to IUB, May 3, 2017
- Department of Statistics Colloquium Series, Indiana University, Bloomington, IN, Oct. 31, 2016
- Intelligent & Interactive Systems Talk Series, School of Informatics and Computing, Indiana University, Bloomington, IN, Oct. 31, 2016
- Graduate School of Culture Technology, KAIST, Daejeon, Korea, Oct. 7, 2016
- Graduate School of Convergence Science and Technology, Seoul National University, Suwon, Korea, Oct. 6, 2016
- Qualcomm Korea, Seoul, Korea, Oct. 6, 2016
- Worldwide Youth in Science and Engineering (WYSE) Summer Camp: Discover Engineering, Urbana, IL, Jun. 27, 2016
- Hanyang University, Seoul, Korea, Apr. 6, 2016
- ETRI, Daejeon, Korea, Mar. 29, 2016
- Naver Labs, Seongnam, Korea, Mar. 29, 2016
- Google, Mountain View, CA, Mar. 9, 2016
- School of Informatics and Computing, Indiana University, Bloomington, IN, Feb. 29, 2016
- Lyric Labs, Analog Devices, Cambridge, MA, Feb. 23, 2016
- Coordinated Science Laboratory Student Conference, Urbana, Feb. 18-19, 2016
- Adobe Research, San Francisco, CA, Feb. 10, 2016
- IBM T. J. Watson Research Center, Yorktown Heights, NY, Jan. 7, 2016
- Speech and Audio in the Northeast (SANE) Workshop, New York, NY, Oct. 22, 2015
- Beckman Graduate Seminar, Urbana, IL, Oct. 14, 2015
- Speech and Audio in the Northeast (SANE) Workshop, New York, NY, Oct. 24, 2013
- Lyric Labs, Analog Devices, Cambridge, MA, Jun. 12, 2012
- Department of Electrical and Computer Engineering, UIUC (with visitors from Sony, Japan), May 10, 2012
- Intel Science and Technology Center – Embedded Computing (ISTC-EC) Workday, Apr. 4-5, 2012
- Sejong University, Seoul, Korea, Jun. 10, 2011

10. SELECTED PATENTS

Named in more than 50 (20 US) patent applications, 10 of which are US patents issued.

- Minje Kim et al, "Irregular Pattern Identification Using Landmark Based Convolution," US Patent Application (pending), 2013
- Minje Kim et al, "Method and System for Separating Music Sound Source Using Time and Frequency Characteristics," US Patent No. 8,563,842, 2013
- Minje Kim et al, "Method and System for Separating Music Sound Source," US Patent No. 8,340,943, 2012
- Minje Kim et al, "Method and system for separating musical sound source without using sound source database," US Patent No. 8,080,724, 2011
- Minje Kim et al, "Method and System for Unified Source Separation," Korea Patent No. 1013754320000, 2014, US Patent Application (Pending), 2011
- Minje Kim et al, "Apparatus and method for separating sound source," Korea Patent No. 1015274410000, 2015
- Minje Kim et al, "Pattern Matching of Sound Data Using Hashing," US Patent No. 9,449,085, 2016
- Minje Kim et al, "Multichannel Sound Source Identification and Localization," US Patent Application (pending), filed in 2013
- Minje Kim et al, "Sound Data Identification," US Patent No. 9,215,539, 2015.
- Minje Kim et al, "Known information compression apparatus and method for separating sound source," US Patent Application (Pending), 2011

11. EXTRACURRICULAR ACTIVITIES

- Some home recordings are available here: http://minjekim.com/ext_acts.html
- The pick of my pics: https://goo.gl/OWvLRc