

Juhan Nam

Korea Advanced Institute of Science and Technology (KAIST)
Graduate School of Culture Technology
291 Daehak-ro, Yuseong-gu, Daejeon, 34141, South Korea

juhan.nam@kaist.ac.kr
<https://mac.kaist.ac.kr/~juhan>

ACADEMIC APPOINTMENTS

Associate Professor *Sep 2019 - Present*
Graduate School of Culture Technology, KAIST

Affiliated Professor *Nov 2019 - Present*
Kim Jaechul Graduate School of Artificial Intelligence, KAIST

Head of Research Center *May 2022 - Present*
Sumi Jo Performing Arts Research Center, KAIST

Assistant Professor *Sep 2014 - Aug 2019*
Graduate School of Culture Technology, KAIST

EDUCATION

Stanford University, CA, USA *Sep 2006 - Jan 2013*
Center for Computer Research in Music and Acoustics (CCRMA)
Ph.D. in Music (Computer-Based Music Theory and Acoustics)
M.S. in Electrical Engineering (en-route)

Seoul National University, Seoul, South Korea *Mar 1994 - Feb 1998*
B.S. in Electrical Engineering

TEACHING AND ADVISING

Regular KAIST Courses

- GCT634/AI613: Musical Applications of Machine Learning
- CTP431: Fundamentals of Computer Music

Lab Students

- Current Students: 15 PhDs and 10 MSs
- Former Students: 7 PhDs and 25 MSs (who earned the degrees)

SELECTED ACADEMIC SERVICES

President *July 2021 - Present*
Korean Society for Music Perception and Cognition (한국음악지각인지학회)

Associate Editor *May 2023 - Present*
IEEE/ACM Transactions on Audio, Speech and Language Processing

Associate Technical Editor *Mar 2021 - Present*
Journal of the Audio Engineering Society

Diversity and Inclusion Co-Chair *2023*
IEEE Workshop on Applications of Signal Processing to Audio and Acoustics

Co-Organizers *2022*
Dagstuhl Seminar (Germany)

Program Co-Chair *2021*
International Society for Music Information Retrieval (ISMIR) Conference

SELECTED AWARDS AND HONORS

International Joint Research Awards Special Awards in Commemoration of the 50th Anniversary of KAIST	2021
Outstanding Faculty Awards (Excellence Prize in Research Innovation) College of Liberal Arts and Convergence Science, KAIST	2019
Samsung Research Funds Samsung Research Funding & Incubation Center for Future Technology	2017

RESEARCH INTERESTS

Music informational retrieval, audio & music signal processing, machine learning, deep learning, computational modelings of performances, interactive music systems, sound synthesis, digital audio effects, human-computer interaction, web audio, music visualization, audio-visual art, soundscape, acoustics, music perception and cognition

SELECTED PUBLICATIONS

Google Scholar: <https://scholar.google.com/citations?user=eG2NHUYAAAAJ&hl=en>

Journals and Conference Papers

- Seungheon Doh, Keunwoo Choi, Jongpil Lee and Juhan Nam, “LP-MusicCaps: LLM-Based Pseudo Music Captioning”, *Proceedings of the 24th International Society for Music Information Retrieval Conference (ISMIR), 2023*
- Haven Kim, Kento Watanabe, Masataka Goto, and Juhan Nam, “A Computational Evaluation Framework for Singable Lyric Translation”, *Proceedings of the 24th International Society for Music Information Retrieval Conference (ISMIR), 2023*
- Taejun Kim and Juhan Nam, “All-In-One Metrical And Functional Structure Analysis With Neighborhood Attentions on Demixed Audio”, *Proceedings of the IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA), 2023*
- Seungheon Doh, Minz Won, Keunwoo Choi, and Juhan Nam, “Textless Speech-to-Music Retrieval Using Emotion Similarity”, *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2023*
- Seungheon Doh, Minz Won, Keunwoo Choi, and Juhan Nam, “Toward Universal Text-to-Music Retrieval”, *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2023*
- Hyemi Kim, Jiyun Park, Taegyun Kwon, Dasaem Jeong, and Juhan Nam, “A Study of Audio Mixing Methods for Piano Transcription in Violin-Piano Ensembles”, *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2023*
- Sangeon Yong, Li Su, and Juhan Nam, “A Phoneme-informed Neural Network Model for Note-level Singing Transcription”, *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2023*
- Eunjin Choi, Yoonjin Chung, Seolhee Lee, Jong Ik Jeon, Taegyun Kwon, and Juhan Nam, “YM2413-MDB : A Multi-Instrumental FM Video Game Music Dataset with Emotion Annotations”, *Proceedings of the 23rd International Society for Music Information Retrieval Conference (ISMIR), 2022*
- Yuya Yamamoto, Juhan Nam, and Hiroko Terasawa, “Analysis and Detection of Singing Techniques in Repertoires of J-POP Solo Singers”, *Proceedings of the 23rd International Society for Music Information Retrieval Conference (ISMIR), 2022*
- Sangeun Kum, Jongpil Lee, Keunhyoung Luke Kim, Taehyoung Kim, and Juhan Nam, “Pseudo-Label Transfer from Frame-Level to Note-Level in a Teacher-Student Framework for Singing Transcription from Polyphonic Music”, *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2022*
- Soonbeom Choi and Juhan Nam, “A Melody-Unsupervision Model for Singing Voice Synthesis”, *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2022*

- Keunhyoung Kim, Jongpil Lee, Sangeun Kum, and Juhan Nam, “Learning a Cross-Domain Embedding Space of Vocal and Mixed audio with a Structure-Preserving Triplet Loss”, *Proceedings of the 22nd International Society for Music Information Retrieval Conference (ISMIR), 2021*
- Hsiao-Tzu Hung, Joann Ching, Seungheon Doh, Nabin Kim, Juhan Nam, and Yi-Hsuan Yang, “EMOPIA: A Multi-Modal Pop Piano Dataset For Emotion Recognition and Emotion-based Music Generation”, *Proceedings of the 22nd International Society for Music Information Retrieval Conference (ISMIR), 2021*
- Taejun Kim, Yi-Hsuan Yang, and Juhan Nam, “Reverse-Engineering The Transition Regions of Real-World DJ Mixes using Sub-band Analysis with Convex Optimization”, *Proceedings of the New Interfaces for Musical Expression (NIME), 2021*
- Keunhyoung Luke Kim, Jongpil Lee, Sangeun Kum, Chae Lin Park, and Juhan Nam, “Semantic Tagging of Singing Voices in Popular Music Recordings”, *IEEE/ACM Transactions on Audio, Speech and Language Processing*, 2020
- Taejun Kim, Minsuk Choi, Evan Sacks, Yi-Hsuan Yang, and Juhan Nam, “A Computational Analysis of Real-World DJ Mixes using Mix-To-Track Subsequence Alignment,” *Proceedings of the 21st International Society for Music Information Retrieval Conference (ISMIR), 2020*
- Taegyun Kwon, Dasaem Jeong, and Juhan Nam, “Polyphonic Piano Transcription Using Autoregressive Multi-Note-State Model”, *Proceedings of the 21st International Society for Music Information Retrieval Conference (ISMIR), 2020*
- Jongpil Lee, Nicholas J. Bryan, Justin Salamon, Zeyu Jin, and Juhan Nam, “Metric Learning VS Classification for Disentangled Music Representation Learning”, *Proceedings of the 21st International Society for Music Information Retrieval Conference (ISMIR), 2020*
- Sangeun Kum, Jing-Hua Lin, Li Su, and Juhan Nam, “Semi-Supervised Learning Using Teacher-Student Models for Vocal Melody Extraction”, *Proceedings of the 21st International Society for Music Information Retrieval Conference (ISMIR), 2020*
- Jongpil Lee, Nicholas J. Bryan, Justin Salamon, Zeyu Jin, and Juhan Nam, “Disentangled Multidimensional Metric Learning for Music Similarity”, *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2020*
- Soonbeom Choi, Wonil Kim, Saebyul Park, Sangeon Yong, and Juhan Nam, “Korean Singing Voice Synthesis Based on Auto-Regressive Boundary Equilibrium GAN”, *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2020*
- Dasaem Jeong, Taegyun Kwon, and Juhan Nam, “Note Intensity Estimation of Piano Recordings Using Coarsely-aligned MIDI Score”, *Journal of the Audio Engineering (JAES) Society*, 2020
- Saebyul Park, Jongpil Lee, Taegyun Kwon, Jeounghoon Kim, and Juhan Nam, “A Cross-Scape Plot Representation for Visualizing Symbolic Melodic Similarity”, *Proceedings of the 20th International Society for Music Information Retrieval Conference (ISMIR), 2019*
- Dasaem Jeong, Taegyun Kwon, Yoojin Kim, and Juhan Nam, “A Hierarchical RNN-based System for Modeling Expressive Piano Performance”, *Proceedings of the 20th International Society for Music Information Retrieval Conference (ISMIR), 2019*
- Jeong Choi, Jongpil Lee, Jiyoung Park, and Juhan Nam, “Zero-shot Learning for Audio-based Music Classification and Tagging”, *Proceedings of the 20th International Society for Music Information Retrieval Conference (ISMIR), 2019*
- Kyunghyun Lee and Juhan Nam, “Learning a Joint Embedding Space of Monophonic and Mixed Music Signals for Singing Voice”, *Proceedings of the 20th International Society for Music Information Retrieval Conference (ISMIR), 2019*
- Dasaem Jeong, Taegyun Kwon, Yoojin Kim, and Juhan Nam, “Graph Neural Network for Music Score Data and Modeling Expressive Piano Performance”, *Proceedings of the 36th International Conference on Machine Learning (ICML), 2019*
- Sangeun Kum and Juhan Nam, “Joint Detection and Classification of Singing Voice Melody Using Convolutional Recurrent Neural Networks,” *Applied Sciences*, 2019

- Taejun Kim, Jongpil Lee, and Juhan Nam, “Comparison and Analysis of SampleCNN Architectures for Audio Classification,” *IEEE Journal of Selected Topics in Signal Processing*, 2019
- Juhan Nam, Keunwoo Choi, Jongpil Lee, Szu-Yu Chou, and Yi-Hsuan Yang, “Deep Learning for Audio-based Music Classification and Tagging,” *IEEE Signal Processing Magazine*, 2018
- Jongpil Lee, Jiyoung Park, Keunhyoung Luke Kim and Juhan Nam, “SampleCNN: End-to-End Deep Convolutional Neural Networks Using Very Small Filters for Music Classification,” *Applied Sciences*, 2018
- Jiyoung Park, Jongpil Lee, Jangyeon Park, Jung-Woo Ha and Juhan Nam, “Representation Learning of Music Using Artist Labels,” *Proceedings of the 19th International Society for Music Information Retrieval Conference (ISMIR)*, 2018
- Kyungyun Lee, Keunwoo Choi and Juhan Nam, “Revisiting Singing Voice Detection: a Quantitative Review and the Future Outlook,” *Proceedings of the 19th International Society for Music Information Retrieval Conference (ISMIR)*, 2018
- Dasaem Jeong, Taegyun Kwon and Juhan Nam, “A Timbre-based Approach to Estimate Key Velocity from Polyphonic Piano Recordings,” *Proceedings of the 19th International Society for Music Information Retrieval Conference (ISMIR)*, 2018
- Sangeon Yong and Juhan Nam, “Singing Expression Transfer from One Voice to Another for a Given Song,” *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2018
- Taejun Kim, Jongpil Lee, and Juhan Nam, “Sample-level CNN Architectures for Music Auto-tagging Using Raw Waveforms,” *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2018
- Jongpil Lee and Juhan Nam, “Multi-Level and Multi-Scale Feature Aggregation Using Pre-trained Convolutional Neural Networks for Music Auto-tagging,” *IEEE Signal Processing Letters*, 2017
- Jongpil Lee, Jiyoung Park, Keunhyoung Luke Kim and Juhan Nam, “Sample-level Deep Convolutional Neural Networks for Music auto-tagging Using Raw Waveforms,” *Proceedings of the 14th Sound and Music Computing Conference (SMC)*, 2017
- Taegyun Kwon, Dasaem Jeong and Juhan Nam, “Audio-to-Score Alignment of Piano Music Using RNN-based Automatic Music Transcription,” *Proceedings of the 14th Sound and Music Computing Conference (SMC)*, 2017
- Sangeun Kum, Changheun Oh and Juhan Nam, “Melody Extraction on Vocal Segments Using Multi-Column Deep Neural Networks,” *Proceedings of International Society for Music Information Retrieval Conference (ISMIR)*, 2016
- Yoonchang Han, Subin Lee, Juhan Nam and Kyogu Lee, “Sparse feature learning for instrument identification: effects of sampling and pooling methods,” *Journal of the Acoustical Society of America (JASA)*, 2016
- Juhan Nam, Jorge Herrera, Malcolm Slaney and Julius Smith, “Learning Sparse Feature Representations for Music annotation and Retrieval ” *Proceedings of the 12th International Society for Music Information Retrieval (ISMIR)*, 2012
- Vesa Välimäki, Jussi Pekonen, Juhan Nam, “Perceptually Informed Synthesis of Bandlimited Classical Waveforms Using Integrated Polynomial Interpolation,” *The Journal of the Acoustical Society of American (JASA)*, 2012
- Juhan Nam, Jiquan Ngiam, Honglak Lee and Malcolm Slaney, “A Classification-Based Polyphonic Piano Transcription Approach Using Learned Feature Representations,” *Proceedings of the 11th International Society for Music Information Retrieval (ISMIR)*, 2011.
- Jiquan Ngiam, Aditya Khosla, Mingyu Kim, Juhan Nam, Honglak Lee, Andrew Ng, ” Multimodal Deep Learning,” *Proceedings of the 28th International Conference on Machine Learning (ICML)*, 2011
- Juhan Nam, Gautham Mysore, Joachim Ganseman, Kyogu Lee, and Jonathan S. Abel, ” A super-resolution spectrogram using coupled PLCA,” *Proceedings of the 11th Conference of the International Speech Communication Association (InterSpeech)*, September 2010
- Juhan Nam, Vesa Välimäki, Jonathan S. Abel, Julius O. Smith, “Efficient Anti-aliasing Oscillators Algorithms Using Low-order Fractional Delay Filters,” *IEEE Transaction on Audio, Speech and Language Processing*, 2010

- Vesa Välimäki, Juhan Nam, Jonathan S. Abel, Julius O. Smith, “Alias-Suppressed Oscillator based on Differentiated Polynomial Waveforms,” *IEEE Transaction on Audio, Speech and Language Processing*, 2010

SELECTED TALKS

International

- “AI and Music Technology: The Current State and Future”, Yamaha Global R&D Meetup, Japan (Keynote)
Jun 2023
- “AI for Classical Music Performance”, Music, Math, and Language Workshop, Korea (Invited Talk) *Jun 2023*
- “Music and AI”, Institute of Music Science and Engineering (IMSE), King Mongkut’s Institute of Technology Ladkrabang, Online (Invited Talk) *Jun 2023*
- “Current State and Future of Music AI”, International Copyright Technology Conference, Korea (Invited Talk)
Nov 2022
- “Deep Learning for Expressive Piano Performance Rendering”, Workshop on AI in Music and Live Concert in conjunction with the 4th IEEE AI & VR (Keynote) *Nov 2021*
- “Music Auto-Tagging: from Audio Classification to Word Embedding”, NLP4MusA Workshop in conjunction with ISMIR 2021 (Invited Talk) *Nov 2021*
- “Metric Learning for Music Information Retrieval”, ISMIR 2020, (Tutorial) *Oct 2020*
- “Deep Metric Learning for Music”, UPF Music Technology Group, Spain (Invited Talk) *Nov 2019*
- “Recent Deep Learning Research for MIR”, Johannes Kepler University, Austria (Invited Talk) *Jul 2017*

Domestic

- “Recent Advances and Future Prospects in Music AI”, NC Developer Party, NCSoft *Jun 2023*
- “음악 창작 AI 기술의 현재와 이슈”, 한국포스트휴먼연구회 *Nov 2022*
- “Deep Learning for Music Information Retrieval”, LG AI Research *Jun 2022*
- “MIR for Music Performance Analysis”, Music Research Institute, Yonsei University *Apr 2022*
- “AI for Classical Music Performance”, Korean Symphony Orchestra *Oct 2021*
- “AI for Classical Music Performance”, Asia Culture Center *Jul 2021*
- “AI for Music Composition, Performance”, and Listening, Seoul National University *Mar 2021*
- “Academic Panel Discussion, Art and Tech Week”, Arts Council Korea *Feb 2021*
- “AI Meets Music”, National Science Museum *Sep 2020*
- “AI Piano and Artistic Possibility”, Art Center Nabi *Sep 2020*
- “Towards Musically Intelligent Machine”, KAIST AI+X Forum *May 2019*
- “Audio-based Music Recommendation Using Deep Learning”, NAVER AI Colloquium 2019 *Apr 2019*
- “Music Performance Machine”, Korea Robotics Society Annual Conference (Special Talk) *Jan 2019*
- “Music Technology in the Age of AI and Classic Music”, Piano Society of Korea *Jul 2017*
- “Music Technology in the Age of AI”, EE Seminar, Postech *May 2017*
- “Towards Musically Intelligent Machine”, Goethe-Institut Seoul *Nov 2017*
- “Music Technology in the Age of AI”, World Science and Culture Forum *Oct 2016*
- “Current Status and Future Directions of Music Technology”, Daejeon Culture Foundation *Apr 2016*