

# Daichi KITAMURA

## PERSONAL DATA

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PLACE OF BIRTH: Kagawa, Japan  
DATE OF BIRTH: March 11th, 1990  
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## EDUCATIONAL BACKGROUND

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MAR. 2017 Ph.D. degree in Informatics, School of Multidisciplinary Sciences, Department of Informatics, **SOKENDAI (The Graduate University for Advanced Studies)**, Japan  
MAR. 2014 M.S. degree in Engineering, Graduate school of Information Science, **Nara Institute of Science and Technology (NAIST)**, Japan  
MAR. 2012 B.S. degree in Engineering, Advanced Course in Industrial and Systems Engineering, **National Institute of Technology (NIT), Kagawa Collage**, Japan  
MAR. 2010 Foundation degree of Engineering, Department of Electrical and Computer Engineering, **National Institute of Technology (NIT), Kagawa Collage**, Japan

## RESEARCH & WORK EXPERIENCES

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JAN. 2022–Present	Senior Lecturer of DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING, NATIONAL INSTITUTE OF TECHNOLOGY, KAGAWA COLLEGE, Japan
APR. 2021–Present	Visitor of NIPPON TELEGRAPH AND TELEPHONE CORPORATION COMMUNICATION SCIENCE LABORATORIES, Japan
APR. 2018–DEC. 2021	Assistant Professor of DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING, NATIONAL INSTITUTE OF TECHNOLOGY, KAGAWA COLLEGE, Japan
APR. 2018–MAR. 2020	Visiting Researcher of DEPARTMENT OF INFORMATION PHYSICS AND COMPUTING, GRADUATE SCHOOL OF INFORMATION SCIENCE AND TECHNOLOGY, THE UNIVERSITY OF TOKYO, Japan
APR. 2017–MAR. 2018	Project Research Associate of DEPARTMENT OF INFORMATION PHYSICS AND COMPUTING, GRADUATE SCHOOL OF INFORMATION SCIENCE AND TECHNOLOGY, THE UNIVERSITY OF TOKYO, Japan
APR. 2017–SEP. 2017	Part-Time Lecturer of DEPARTMENT OF HUMAN ENVIRONMENT DESIGN, FACULTY OF HUMAN LIFE DESIGN, TOYO UNIVERSITY, Japan
APR. 2014–MAR. 2017	Research Fellow (DC1) of JAPAN SOCIETY OF THE PROMOTION OF SCIENCE (JSPS), Japan
MAY 2015–FEB. 2017	Research Assistant with Superordinate Wages of RESEARCH ORGANIZATION OF INFORMATION AND SYSTEMS (ROIS), Japan
MAY 2014–APR. 2015	Research Assistant of RESEARCH ORGANIZATION OF INFORMATION AND SYSTEMS (ROIS), Japan
JUN. 2013–AUG. 2013	Teaching Assistant of GRADUATE SCHOOL OF INFORMATION SCIENCE, NARA INSTITUTE OF SCIENCE AND TECHNOLOGY (NAIST), Japan

## VOLUNTEER WORKS

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JUN. 2021–Present	Committee Member of TECHNICAL GROUP ON SIGNAL PROCESSING, THE INSTITUTE OF ELECTRONICS, INFORMATION AND COMMUNICATION ENGINEERS (IEICE), Japan
JUN. 2018–Present	Committee Member of TECHNICAL GROUP ON ENGINEERING ACOUSTICS, THE INSTITUTE OF ELECTRONICS, INFORMATION AND COMMUNICATION ENGINEERS (IEICE), Japan
JUL. 2017–SEP. 2018	Organizing Committee Member (Local Arrangement Chair) of 16TH INTERNATIONAL WORKSHOP ON ACOUSTIC SIGNAL ENHANCEMENT (IWAENC 2018), Japan
MAR. 2014–MAR. 2019	Students and Young Researchers Forum Member of THE ACOUSTICAL SOCIETY OF JAPAN (ASJ), Japan
JAN. 2016–FEB. 2017	Evaluation Organizing Committee Member of SIXTH COMMUNITY-BASED SIGNAL SEPARATION EVALUATION CAMPAIGN (SISEC 2016)
SEP. 2014–SEP. 2015	Evaluation Organizing Committee Member of FIFTH COMMUNITY-BASED SIGNAL SEPARATION EVALUATION CAMPAIGN (SISEC 2015)

## AWARDS RECEIVED

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DEC. 2021	Sadaoki Furui Prize Paper Award 2021, ASIA-PACIFIC SIGNAL AND INFORMATION PROCESSING ASSOCIATION (APSIPA)
JUN. 2021	Best Presentation Award, INFORMATION PROCESSING SOCIETY OF JAPAN 2021 OTOGAKU SYMPOSIUM
DEC. 2019	2019 Young Author Best Paper Award, IEEE SIGNAL PROCESSING SOCIETY (SPS)
NOV. 2018	Best Paper Award, ASIA-PACIFIC SIGNAL AND INFORMATION PROCESSING ASSOCIATION (APSIPA) ANNUAL SUMMIT AND CONFERENCE 2018
MAR. 2018	The Telecom System Technology Award (Encouragement Award), THE TELECOMMUNICATION ADVANCEMENT FOUNDATION (TAF)
MAR. 2018	The 13 <sup>th</sup> Itakura Prize Innovative Young Researcher Award, THE ACOUSTICAL SOCIETY OF JAPAN (ASJ)
NOV. 2017	Best Paper Award, IEEE SIGNAL PROCESSING SOCIETY (SPS) JAPAN
SEP. 2017	FY2016 22 <sup>nd</sup> Nagakura Research Incentive Award, SOKENDAI (THE GRADUATE UNIVERSITY FOR ADVANCED STUDIES)
JUL. 2017	21 <sup>st</sup> Annual Best of Computing Notable Books and Articles in Computing of 2016, ACM COMPUTING REVIEWS
MAR. 2017	Seventh (FY2016) Ikushi Prize, JAPAN SOCIETY FOR THE PROMOTION OF SCIENCE (JSPS)
MAR. 2016	The Telecom System Technology Student Award, THE TELECOMMUNICATION ADVANCEMENT FOUNDATION (TAF)
NOV. 2015	Student Conference Paper Award, IEEE SIGNAL PROCESSING SOCIETY (SPS) JAPAN CHAPTER
SEP. 2015	2015 The 1 <sup>st</sup> Best Student Award, NATIONAL INSTITUTE OF INFORMATICS (NII)
MAR. 2015	The 37 <sup>th</sup> Awaya Prize Young Researcher Award, THE ACOUSTICAL SOCIETY OF JAPAN (ASJ)
NOV. 2014	2013 Technical Group on Signal Processing Young Researcher's Award, THE INSTITUTE OF ELECTRONICS, INFORMATION AND COMMUNICATION ENGINEERS (IEICE)
MAY. 2014	Total Exemption from Repayment of Scholarship Loan for Students with Outstanding Results, JAPAN STUDENT SERVICES ORGANIZATION (JASSO)
MAR. 2014	Master's Best Student Award, NARA INSTITUTE OF SCIENCE AND TECHNOLOGY (NAIST)
MAR. 2014	NCSP'14 Student Paper Award, 2014 RISP INTERNATIONAL WORKSHOP ON NONLINEAR CIRCUITS, COMMUNICATIONS AND SIGNAL PROCESSING (NCSP 2014)
NOV. 2013	The 8 <sup>th</sup> Student Presentation Award, THE ACOUSTICAL SOCIETY OF JAPAN (ASJ)
MAR. 2010	The Best Graduation Research Award, DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING, TAKAMATSU NATIONAL COLLEGE OF TECHNOLOGY (TNCT)
MAR. 2010	Engineers Encouragement Award, THE SHIKOKU SECTION OF THE INSTITUTE OF ELECTRONICS, INFORMATION AND COMMUNICATION ENGINEERS (IEICE)

## COMPETITIVE FUNDS

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- APR. 2022–MAR. 2026 JSPS Grant-in-Aid for Scientific Research (B) (KAKENHI), "Mathematical Deepening of Audio Source Separation Based on Independence and Amplitude/Phase Modeling and Development of Multimodal Hearing-Aid system (Grant No. 22H03652)", **Principal Investigator**, JAPAN SOCIETY FOR THE PROMOTION OF SCIENCE (JSPS)
- APR. 2022–MAR. 2025 JSPS Grant-in-Aid for Scientific Research (B) (KAKENHI), "Fundamental Study of Continuous Blood Pressure Measurement Using a Wearable Sensor Attached to Nail Surface (Grant No. 22H03982)", Co-Investigator, JAPAN SOCIETY FOR THE PROMOTION OF SCIENCE (JSPS)
- APR. 2021–MAR. 2022 "Analysis of Relative Characteristics for Multiple Musical Instruments Based on Matrix Decomposition Theory and Deep Learning", **Principal Investigator**, ONO CHARITABLE TRUST FOR ACOUSTICS
- APR. 2019–MAR. 2022 JSPS Grant-in-Aid for Young Scientists (KAKENHI), "Unification of Deep Learning and Generalized Mathematical Model for Independence-Based Audio Source Separation (Grant No. 19K20306)", **Principal Investigator**, JAPAN SOCIETY FOR THE PROMOTION OF SCIENCE (JSPS)
- APR. 2019–MAR. 2023 JSPS Grant-in-Aid for Scientific Research (A) (KAKENHI), "Audio Augmented Reality and Extension of Audio Communication Ability Based on Small Data Machine Learning Theory (Grant No. 19H01116)", Co-Investigator, JAPAN SOCIETY FOR THE PROMOTION OF SCIENCE (JSPS)
- AUG. 2017–MAR. 2019 JSPS Grant-in-Aid for Research Activity start-up (KAKENHI), "Extended Theories of Audio Source Separation Based on Statistical Independence and Various Mathematical Structures (Grant No. 17H06572)", **Principal Investigator**, JAPAN SOCIETY FOR THE PROMOTION OF SCIENCE (JSPS)
- JUN. 2015 Grants for Researchers Attending International Conferences, THE TELECOMMUNICATIONS ADVANCEMENT FOUNDATION (TAF)
- MAY 2014–MAR. 2017 Grant-in-Aid for JSPS Fellows (DC1), "Multi-Dimensional Media Processing Based on Sparse Signal Decompositions and Its Application to Audio Augmented Reality (Grant No. 14J10796)", **Principal Investigator**, JAPAN SOCIETY OF THE PROMOTION OF SCIENCE (JSPS)
- APR. 2013 Grants for Researchers Attending International Conferences, NEC C&C FOUNDATION

## RESEARCH INTERESTS

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### Field

- Statistical Signal Processing,
- Machine Learning
- Pattern Recognition
- Audio Signal Processing
- Array Signal Processing
- Optimization Theory

### Topics

- Blind and Supervised Audio Source Separation
- Nonnegative Matrix Factorization
- Independent Component Analysis
- Deep Neural Networks

## PUBLICATIONS

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### Book Chapters

1. **Daichi Kitamura**, Nobutaka Ono, Hiroshi Sawada, Hirokazu Kameoka, and Hiroshi Saruwatari, "Determined blind source separation with independent low-rank matrix analysis," *Audio Source Separation. Signals and Communication Technology.*, Shoji Makino, Ed. Springer, Cham, pp. 125–155, March 2018.
2. **Daichi Kitamura**, "Q11 What is beamforming?," *Acousticpedia for Beginners*, Acoustical Society of Japan, Eds. Corona Publishing, pp. 44–47, March 2017 (in Japanese).

## Journal Papers

1. Yuto Kondo, Yuki Kubo, Norihiro Takamune, **Daichi Kitamura**, and Hiroshi Saruwatari, "Deficient-basis-complementary rank-constrained spatial covariance matrix estimation based on multivariate generalized Gaussian distribution for blind speech extraction," *EURASIP Journal on Advances in Signal Processing*, 2022 (in press).
2. Yuta Iwase and **Daichi Kitamura**, "Supervised audio source separation based on nonnegative matrix factorization with cosine similarity penalty," *IEICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences*, vol. E105-A, no. 6, pp. 906–913, Jun 2022.
3. Keigo Kamo, Yoshiki Mitsui, Yuki Kubo, Norihiro Takamune, **Daichi Kitamura**, Hiroshi Saruwatari, Yu Takahashi, and Kazunobu Kondo, "Joint-diagonalizability-constrained multichannel nonnegative matrix factorization based on time-variant multivariate complex sub-Gaussian distribution," *Signal Processing*, vol. 188, 108183, November 2021.
4. Fuga Oshima, Masaki Nakano, and **Daichi Kitamura**, "Interactive speech source separation based on independent low-rank matrix analysis," *Acoustical Science and Technology*, vol. 42, no. 4, pp. 222–225, July 2021.
5. Kohei Yatabe and **Daichi Kitamura**, "Determined BSS based on time-frequency masking and its application to harmonic vector analysis," *IEEE/ACM Transaction on Audio, Speech, and Language Processing*, vol. 29, pp. 1609–1625, April 2021.
6. Akihito Aiba, Minoru Yoshida, **Daichi Kitamura**, Shinnosuke Takamichi, and Hiroshi Saruwatari, "Noise robust acoustic anomaly detection system with nonnegative matrix factorization based on generalized Gaussian distribution," *IEICE Transactions on Information and Systems*, vol. E104-D, no. 3, pp. 441–449, March 2021.
7. Naoki Makishima, Yoshiki Mitsui, Norihiro Takamune, **Daichi Kitamura**, Hiroshi Saruwatari, Yu Takahashi, and Kazunobu Kondo, "Independent deeply learned matrix analysis with automatic selection of stable microphone-wise update and fast sourcewise update of demixing matrix," *Signal Processing*, vol. 178, 107753, January 2021.
8. **Daichi Kitamura** and Kohei Yatabe, "Consistent independent low-rank matrix analysis for determined blind source separation," *EURASIP Journal on Advances in Signal Processing*, vol. 2020, no. 46, p. 35, November 2020.
9. Yuki Kubo, Norihiro Takamune, **Daichi Kitamura**, and Hiroshi Saruwatari, "Blind speech extraction based on rank-constrained spatial covariance matrix estimation with multivariate generalized Gaussian distribution," *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, vol. 28, pp. 1948–1963, June 2020.
10. Shinnosuke Takamichi, Yuki Saito, Norihiro Takamune, **Daichi Kitamura**, and Hiroshi Saruwatari, "Phase reconstruction from amplitude spectrograms based on directional-statistics deep neural networks," *Signal Processing*, vol. 169, 107368, April 2020.
11. Shinichi Mogami, Norihiro Takamune, **Daichi Kitamura**, Hiroshi Saruwatari, Yu Takahashi, Kazunobu Kondo, and Nobutaka Ono, "Independent low-rank matrix analysis based on time-variant sub-Gaussian source model for determined blind source separation," *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, vol. 28, pp. 503–518, December 2019.
12. Yuki Mitsufuji, Stefan Uhlich, Norihiro Takamune, **Daichi Kitamura**, Shoichi Koyama, and Hiroshi Saruwatari, "Multichannel non-negative matrix factorization using banded spatial covariance matrices in wavenumber domain," *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, vol. 28, pp.49–60, October 2019.
13. Naoki Makishima, Shinichi Mogami, Norihiro Takamune, **Daichi Kitamura**, Hayato Sumino, Shinnosuke Takamichi, Hiroshi Saruwatari, and Nobutaka Ono, "Independent deeply learned matrix analysis for determined audio source separation," *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, vol. 27, no. 10, pp. 1601–1615, October 2019.
14. Hiroaki Nakajima, **Daichi Kitamura**, Norihiro Takamune, Hiroshi Saruwatari, and Nobutaka Ono, "Bilevel optimization using stationary point of lower-level objective function for discriminative basis learning in nonnegative matrix factorization," *IEEE Signal Processing Letters*, vol. 26, no. 6, pp. 818–822, June 2019.

15. Hiroshi Sawada, Nobutaka Ono, Hirokazu Kameoka, **Daichi Kitamura**, and Hiroshi Saruwatari, "A review of blind source separation methods: Two converging routes to ILRMA originating from ICA and NMF," *APSIPA Transactions on Signal and Information Processing*, vol. 8, no. e12, pp. 1–14, May 2019.
16. Shinichi Mogami, Yoshiki Mitsui, Norihiro Takamune, **Daichi Kitamura**, Hiroshi Saruwatari, Yu Takahashi, Kazunobu Kondo, Hiroaki Nakajima, and Hirokazu Kameoka, "Independent low-rank matrix analysis based on generalized Kullback-Leibler divergence," *IEICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences*, vol. E102-A, no. 2, pp. 458–463, February 2019.
17. **Daichi Kitamura**, Shinichi Mogami, Yoshiki Mitsui, Norihiro Takamune, Hiroshi Saruwatari, Nobutaka Ono, Yu Takahashi, and Kazunobu Kondo, "Generalized independent low-rank matrix analysis using heavy-tailed distributions for blind source separation," *EURASIP Journal on Advances in Signal Processing*, vol. 2018, no. 1, p. 28, May, 2018.
18. Yoshiaki Bando, Hiroshi Saruwatari, Nobutaka Ono, Shoji Makino, Katustoshi Itoyama, **Daichi Kitamura**, Masaru Ishimura, Moe Takakusaki, Narumi Mae, Kouei Yamaoka, Yutaro Matsui, Yuichi Ambe, Masashi Konyo, Satoshi Tadokoro, Kazuyoshi Yoshii, and Hiroshi G. Okuno, "Low-latency and high-quality two-stage human-voice-enhancement system for a hose-shaped rescue robot," *Journal of Robotics and Mechatronics*, vol. 29, no. 1, pp.198–212, February 2017.
19. **Daichi Kitamura**, Nobutaka Ono, Hiroshi Sawada, Hirokazu Kameoka, and Hiroshi Saruwatari, "Determined blind source separation unifying independent vector analysis and nonnegative matrix factorization," *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, vol. 24, no. 9, pp. 1626–1641, September, 2016.
20. **Daichi Kitamura**, Hiroshi Saruwatari, Hirokazu Kameoka, Yu Takahashi, Kazunobu Kondo, and Satoshi Nakamura, "Multichannel signal separation combining directional clustering and nonnegative matrix factorization with spectrogram restoration," *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, vol. 23, no. 4, pp. 654–669, April 2015.
21. Tomo Miyauchi, **Daichi Kitamura**, Hiroshi Saruwatari, and Satoshi Nakamura, "Depth estimation of sound images using directional clustering and activation-shared nonnegative matrix factorization," *Journal of Signal Processing*, vol. 18, no. 4, pp. 217–220, July 2014 (corresponding author).
22. **Daichi Kitamura**, Hiroshi Saruwatari, Kosuke Yagi, Kiyohiro Shikano, Yu Takahashi, and Kazunobu Kondo, "Music signal separation based on supervised nonnegative matrix factorization with orthogonality and maximum-divergence penalties," *IEICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences*, vol. E97-A, no. 5, pp. 1113–1118, May 2014.
23. Masahiro Harazono, **Daichi Kitamura**, and Masashi Nakayama, "Humbucking pickup response excited by string vibration," *Acoustical Science and Technology*, vol. 33, no. 5, pp. 301–309, 2012.

## Peer-Reviewed International Conference Proceedings

1. Fumiya Hasuike, **Daichi Kitamura**, and Rui Watanabe, "DNN-based frequency-domain permutation solver for multichannel audio source separation," *Proceedings of Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC 2022)*, pp. 872–877, Chiang Mai, Thailand, November 2022.
2. Keito Murata, **Daichi Kitamura**, Daichi Ueki, and Ryo Saito, "Heart rate estimation of car driver using radar sensors and blind source separation," *Proceedings of Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC 2022)*, pp. 1157–1164, Chiang Mai, Thailand, November 2022.
3. Masaya Kawamura, Tomohiko Nakamura, **Daichi Kitamura**, Hiroshi Saruwatari, Yu Takahashi, and Kazunobu Kondo, "Differentiable digital signal processing mixture model for synthesis parameter extraction from mixture of harmonic sounds," *Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2022)*, pp. 941–945, Singapore, May 2022.
4. Yusaku Mizobuchi, **Daichi Kitamura**, Tomohiko Nakamura, Hiroshi Saruwatari, Yu Takahashi, and Kazunobu Kondo, "Prior distribution design for music bleeding-sound reduction based on nonnegative matrix factorization," *Proceedings of Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC 2021)*, pp. 651–658, Tokyo, Japan, December 2021.

5. Takuya Hasumi, Tomohiko Nakamura, Norihiro Takamune, Hiroshi Saruwatari, **Daichi Kitamura**, Yu Takahashi, and Kazunobu Kondo, "Multichannel audio source separation with independent deeply learned matrix analysis using product of source models," *Proceedings of Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC 2021)*, pp. 1226–1233, Tokyo, Japan, December 2021.
6. Sota Misawa, Norihiro Takamune, Tomohiko Nakamura, **Daichi Kitamura**, Hiroshi Saruwatari, Masakazu Une, and Shoji Makino, "Speech enhancement by noise self-supervised rank-constrained spatial covariance matrix estimation via independent deeply learned matrix analysis," *Proceedings of Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC 2021)*, pp. 578–584, Tokyo, Japan, December 2021.
7. Takuya Hasumi, Tomohiko Nakamura, Norihiro Takamune, Hiroshi Saruwatari, **Daichi Kitamura**, Yu Takahashi, and Kazunobu Kondo, "Empirical Bayesian independent deeply learned matrix analysis for multichannel audio source separation," *Proceedings of European Signal Processing Conference (EUSIPCO 2021)*, pp. 331–335, Dublin, Ireland, August 2021.
8. Naoki Narisawa, Rintaro Ikeshita, Norihiro Takamune, **Daichi Kitamura**, Tomohiko Nakamura, Hiroshi Saruwatari, and Tomohiro Nakatani, "Independent deeply learned tensor analysis for determined audio source separation," *Proceedings of European Signal Processing Conference (EUSIPCO 2021)*, pp. 326–330, Dublin, Ireland, August 2021.
9. Soichiro Oyabu, **Daichi Kitamura**, and Kohei Yatabe, "Linear multichannel blind source separation based on time-frequency mask obtained by harmonic/percussive sound separation," *Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2021)*, pp. 201–205, Toronto, Canada, June 2021.
10. Yuto Kondo, Yuki Kubo, Norihiro Takamune, **Daichi Kitamura**, and Hiroshi Saruwatari, "Deficient basis estimation of noise spatial covariance matrix for rank-constrained spatial covariance matrix estimation method in blind speech extraction," *Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2021)*, pp. 806–810, Toronto, Canada, June 2021.
11. Rui Watanabe, **Daichi Kitamura**, Hiroshi Saruwatari, Yu Takahashi, and Kazunobu Kondo, "DNN-based frequency component prediction for frequency-domain audio source separation," *Proceedings of European Signal Processing Conference (EUSIPCO 2020)*, pp. 805–809, Amsterdam, Netherlands, January 2021.
12. Keigo Kamo, Yuki Kubo, Norihiro Takamune, **Daichi Kitamura**, Hiroshi Saruwatari, Yu Takahashi, and Kazunobu Kondo, "Joint-diagonalizability-constrained multichannel nonnegative matrix factorization based on multivariate complex sub-Gaussian distribution," *Proceedings of European Signal Processing Conference (EUSIPCO 2020)*, pp. 890–894, Amsterdam, Netherlands, January 2021.
13. Shuhei Yamaji and **Daichi Kitamura**, "DNN-based permutation solver for frequency-domain independent component analysis in two-source mixture case," *Proceedings of Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC 2020)*, pp. 781–787, Auckland, New Zealand, December 2020.
14. Keigo Kamo, Yuki Kubo, Norihiro Takamune, **Daichi Kitamura**, Hiroshi Saruwatari, Yu Takahashi, and Kazunobu Kondo, "Joint-diagonalizability-constrained multichannel nonnegative matrix factorization based on multivariate complex Student's t-distribution," *Proceedings of Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC 2020)*, pp. 869–874, Auckland, New Zealand, December 2020.
15. Masakazu Une, Yuki Kubo, Norihiro Takamune, **Daichi Kitamura**, Hiroshi Saruwatari, and Shoji Makino, "Multichannel hearing-aid system based on basis-shared semi-supervised independent low-rank matrix analysis," *Proceedings of Forum Acusticum*, pp. 811–817, Lyon, France, December 2020.
16. Keigo Kamo, Yuki Kubo, Norihiro Takamune, **Daichi Kitamura**, Hiroshi Saruwatari, Yu Takahashi, and Kazunobu Kondo, "Regularized fast multichannel nonnegative matrix factorization with ILRMA-based prior distribution of joint-diagonalization process," *Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2020)*, pp. 606–610, Barcelona, Spain, May 2020.
17. Tatsuki Kondo, Kanta Fukushige, Norihiro Takamune, **Daichi Kitamura**, Hiroshi Saruwatari, Rintaro Ikeshita, and Tomohiro Nakatani, "Convergence-guaranteed independent positive semidefinite tensor

- analysis based on Student's  $t$  distribution," *Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2020)*, pp. 681–685, Barcelona, Spain, May 2020.
18. Naoki Makishima, Norihiro Takamune, **Daichi Kitamura**, Hiroshi Saruwatari, Yu Takahashi, and Kazunobu Kondo, "Robust demixing filter update algorithm based on microphone-wise coordinate descent for independent deeply learned matrix analysis," *Proceedings of Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC 2019)*, pp. 1868–1873, Lanzhou, China, November 2019.
  19. Yuki Kubo, Norihiro Takamune, **Daichi Kitamura**, and Hiroshi Saruwatari, "Acceleration of rank-constrained spatial covariance matrix estimation for blind speech extraction," *Proceedings of Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC 2019)*, pp. 332–338, Lanzhou, China, November 2019.
  20. Masakazu Une, Yuki Kubo, Norihiro Takamune, **Daichi Kitamura**, Hiroshi Saruwatari, and Shoji Makino, "Evaluation of multichannel hearing aid system using rank-constrained spatial covariance matrix estimation," *Proceedings of Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC 2019)*, pp. 1874–1879, Lanzhou, China, November 2019.
  21. Naoki Makishima, Norihiro Takamune, **Daichi Kitamura**, Hiroshi Saruwatari, Yu Takahashi, and Kazunobu Kondo, "Column-wise update algorithm for independent deeply learned matrix analysis," *Proceedings of International Congress on Acoustics (ICA 2019)*, pp. 2805–2812, Aachen, Germany, September 2019.
  22. Yuki Kubo, Norihiro Takamune, **Daichi Kitamura**, and Hiroshi Saruwatari, "Efficient full-rank spatial covariance estimation using independent low-rank matrix analysis for blind source separation," *Proceedings of European Signal Processing Conference (EUSIPCO 2019)*, A Coruna, Spain, September 2019.
  23. Naoki Makishima, Norihiro Takamune, **Daichi Kitamura**, Hiroshi Saruwatari, Yu Takahashi, Kazunobu Kondo, and Hiroaki Nakajima, "Generalized-Gaussian-distribution-based independent deeply learned matrix analysis for multichannel audio source separation," *Proceedings of International Congress and Exhibition on Noise Control Engineering (INTERNOISE 2019)*, Madrid, Spain, June 2019.
  24. Kohei Yatabe and **Daichi Kitamura**, "Time-frequency-masking-based determined BSS with application to sparse IVA," *Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2019)*, pp. 715–719, Brighton, U.K., May 2019.
  25. Shinichi Mogami, Norihiro Takamune, **Daichi Kitamura**, Hiroshi Saruwatari, Yu Takahashi, Kazunobu Kondo, Hiroaki Nakajima, and Nobutaka Ono, "Independent low-rank matrix analysis based on time-variant sub-Gaussian source model," *Proceedings of Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC 2018)*, pp. 1684–1691, November 2018.
  26. Masakazu Une, Yuki Saito, Shinnosuke Takamichi, **Daichi Kitamura**, Ryoichi Miyazaki, and Hiroshi Saruwatari, "Generative approach using the noise generation models for DNN-based speech synthesis trained from noisy speech," *Proceedings of Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC 2018)*, pp. 340–344, November 2018.
  27. Shinnosuke Takamichi, Yuki Saito, Norihiro Takamune, **Daichi Kitamura**, and Hiroshi Saruwatari, "Phase reconstruction from amplitude spectrograms based on von-Mises-distribution deep neural network," *Proceedings of International Workshop on Acoustic Signal Enhancement (IWAENC 2018)*, pp. 286–290, Tokyo, Japan, September 2018.
  28. Shinichi Mogami, Hayato Sumino, **Daichi Kitamura**, Norihiro Takamune, Shinnosuke Takamichi, Hiroshi Saruwatari, and Nobutaka Ono, "Independent deeply learned matrix analysis for multichannel audio source separation," *Proceedings of European Signal Processing Conference (EUSIPCO 2018)*, pp. 1571–1575, Roma, Italy, September, 2018.
  29. Kohei Yatabe and **Daichi Kitamura**, "Determined blind source separation via proximal splitting algorithm," *Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2018)*, pp. 776–780, Calgary, Canada, April, 2018.
  30. Yoshiki Mitsui, Norihiro Takamune, **Daichi Kitamura**, Hiroshi Saruwatari, Yu Takahashi, and Kazunobu Kondo, "Vectorwise coordinate descent algorithm for spatially regularized independent low-rank matrix analysis," *Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2018)*, pp. 746–750, Calgary, Canada, April, 2018.

31. Narumi Mae, Koei Yamaoka, Yoshiki Mitsui, Mitsuo Matsumoto, Shoji Makino, **Daichi Kitamura**, Nobutaka Ono, Takeshi Yamada, and Hiroshi Saruwatari, "Ego noise reduction and sound localization adapted to human ears using hose-shaped rescue robot," *Proceedings of RISP International Workshop on Nonlinear Circuits, Communications and Signal Processing (NCSP 2018)*, pp. 371–374, Hawaii, USA, March 2018.
32. Moe Takakusaki, **Daichi Kitamura**, Nobutaka Ono, Shoji Makino, Takeshi Yamada, and Hiroshi Saruwatari, "Ego-noise reduction for hose-shaped rescue robot using basis-shared semi-supervised independent low-rank matrix analysis," *Proceedings of RISP International Workshop on Nonlinear Circuits, Communications and Signal Processing (NCSP 2018)*, pp. 351–354, Hawaii, USA, March 2018 (Student Paper Award).
33. Narumi Mae, Yoshiki Mitsui, Shoji Makino, **Daichi Kitamura**, Nobutaka Ono, Takeshi Yamada, and Hiroshi Saruwatari, "Sound source localization using binaural different for hose-shaped rescue robot," *Proceedings of Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC 2017)*, Kuala Lumpur, Malaysia, December, 2017.
34. Yoshiki Mitsui, **Daichi Kitamura**, Norihiro Takamune, Hiroshi Saruwatari, Yu Takahashi, and Kazunobu Kondo, "Independent low-rank matrix analysis based on parametric majorization-equalization algorithm," *Proceedings of IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing (CAMSAP 2017)*, pp. 98–102, Curaçao, Dutch Antilles, December, 2017.
35. Sinichi Mogami, **Daichi Kitamura**, Yoshiki Mitsui, Norihiro Takamune, Hiroshi Saruwatari, and Nobutaka Ono, "Independent low-rank matrix analysis based on complex Student's  $t$ -distribution for blind audio source separation," *Proceedings of IEEE International Workshop on Machine Learning for Signal Processing (MLSP 2017)*, Tokyo, Japan, September, 2017.
36. **Daichi Kitamura**, Nobutaka Ono, and Hiroshi Saruwatari, "Experimental analysis of optimal window length for independent low-rank matrix analysis," *Proceedings of The 2017 European Signal Processing Conference (EUSIPCO 2017)*, pp. 1210–1214, Kos, Greece, August 2017 (Invited Special Session).
37. Yoshiki Mitsui, **Daichi Kitamura**, Shinnosuke Takamichi, Nobutaka Ono, and Hiroshi Saruwatari, "Blind source separation based on independent low-rank matrix analysis with sparse regularization for time-series activity," *Proceedings of The 42nd IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2017)*, pp. 21–25, New Orleans, U.S.A., March, 2017 (Student Paper Contest Finalist).
38. Antoine Liutkus, Fabian-Robert Stöter, Zafar Rafii, **Daichi Kitamura**, Bertrand Rivet, Nobutaka Ito, Nobutaka Ono, and Julie Fontecave, "The 2016 signal separation evaluation campaign," *Proceedings of 13th International Conference on Latent Variable Analysis and Signal Separation (LVA/ICA 2017)*, pp. 323–332, Grenoble, France, February, 2017.
39. Narumi Mae, Masaru Ishimura, **Daichi Kitamura**, Nobutaka Ono, Takeshi Yamada, Shoji Makino, and Hiroshi Saruwatari, "Ego noise reduction for hose-shaped rescue robot combining independent low-rank matrix analysis and multichannel noise cancellation," *Proceedings of 13th International Conference on Latent Variable Analysis and Signal Separation (LVA/ICA 2017)*, pp. 141–151, Grenoble, France, February, 2017.
40. Narumi Mae, **Daichi Kitamura**, Masaru Ishimura, Takeshi Yamada, and Shoji Makino, "Ego noise reduction for hose-shaped rescue robot combining independent low-rank matrix analysis and noise cancellation," *Proceedings of Asia-Pacific Signal and Information Process Processing Association Annual Summit and Conference (APSIPA ASC 2016)*, Jeju, Korea, December 2016.
41. Hiroaki Nakajima, **Daichi Kitamura**, Norihiro Takamune, Shoichi Koyama, Hiroshi Saruwatari, Yu Takahashi, and Kazunobu Kondo, "Audio signal separation using supervised NMF with time-variant all-pole-model-based basis deformation," *Proceedings of Asia-Pacific Signal and Information Process Processing Association Annual Summit and Conference (APSIPA ASC 2016)*, Jeju, Korea, December 2016.
42. **Daichi Kitamura** and Nobutaka Ono, "Efficient initialization for nonnegative matrix factorization based on nonnegative independent component analysis," *Proceedings of The 15th International Workshop on Acoustic Signal Enhancement (IWAENC 2016)*, Xi'an, China, September 2016 (Student Paper Competition Finalist).
43. **Daichi Kitamura**, Nobutaka Ono, Hiroshi Saruwatari, Yu Takahashi, and Kazunobu Kondo, "Discriminative and reconstructive basis training for audio source separation with semi-supervised nonnegative matrix factorization," *Proceedings of The 15th International Workshop on Acoustic Signal Enhancement (IWAENC 2016)*, Xi'an, China, September 2016.



44. Moe Takakusaki, **Daichi Kitamura**, Nobutaka Ono, Takeshi Yamada, Shoji Makino, and Hiroshi Saruwatari, "Ego-noise reduction for a hose-shaped rescue robot using determined rank-1 multichannel nonnegative matrix factorization," *Proceedings of The 15th International Workshop on Acoustic Signal Enhancement (IWAENC 2016)*, Xi'an, China, September 2016.
45. Hiroaki Nakajima, **Daichi Kitamura**, Norihiro Takamune, Shoichi Koyama, Hiroshi Saruwatari, Nobutaka Ono, Yu Takahashi, and Kazunobu Kondo, "Music signal separation using supervised NMF with all-pole-model-based discriminative basis deformation," *Proceedings of The 2016 European Signal Processing Conference (EUSIPCO 2016)*, pp. 1143–1147, Budapest, Hungary, September 2016.
46. **Daichi Kitamura**, Nobutaka Ono, Hiroshi Sawada, Hirokazu Kameoka, and Hiroshi Saruwatari, "Relaxation of rank-1 spatial constraint in overdetermined blind source separation," *Proceedings of The 2015 European Signal Processing Conference (EUSIPCO 2015)*, pp. 1271–1275, Nice, France, September 2015 (Invited Special Session).
47. Nobutaka Ono, Zafar Rafii, **Daichi Kitamura**, Nobutaka Ito, and Antoine Liutkus, "The 2015 signal separation evaluation campaign," *Proceedings of 12th International Conference on Latent Variable Analysis and Signal Separation (LVA/ICA 2015)*, Liberec, Czech, August 2015.
48. **Daichi Kitamura**, Nobutaka Ono, Hiroshi Sawada, Hirokazu Kameoka, and Hiroshi Saruwatari, "Efficient multichannel nonnegative matrix factorization exploiting rank-1 spatial model," *Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2015)*, pp. 276–280, Brisbane, Australia, April 2015.
49. Yuki Murota, **Daichi Kitamura**, Shoichi Koyama, Hiroshi Saruwatari, Satoshi Nakamura, "Statistical modeling of binaural signal and its application to binaural source separation," *Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2015)*, pp. 494–498, Brisbane, Australia, April 2015.
50. **Daichi Kitamura**, Hiroshi Saruwatari, Satoshi Nakamura, Yu Takahashi, Kazunobu Kondo, and Hirokazu Kameoka, "Hybrid multichannel signal separation using supervised nonnegative matrix factorization with spectrogram restoration," *Proceedings of Asia-Pacific Signal and Information Processing Association Annual Summit and Conference 2014 (APSIPA 2014)*, Siem Reap, Cambodia, December 2014 (Invited Special Session).
51. **Daichi Kitamura**, Hiroshi Saruwatari, Satoshi Nakamura, Yu Takahashi, Kazunobu Kondo, and Hirokazu Kameoka, "Divergence optimization in nonnegative matrix factorization with spectrogram restoration for multichannel signal separation," *Proceedings of 4th Joint Workshop on Hands-free Speech Communication and Microphone Arrays (HSCMA 2014)*, pp. 92–96, Nancy, France, May 2014.
52. Yuki Murota, **Daichi Kitamura**, Hiroshi Saruwatari, Satoshi Nakamura, Yu Takahashi, and Kazunobu Kondo, "Music signal separation based on Bayesian spectral amplitude estimator with automatic target prior adaptation," *Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2014)*, pp. 7540–7544, Frolence, Italy, May 2014.
53. **Daichi Kitamura**, Hiroshi Saruwatari, Satoshi Nakamura, Yu Takahashi, Kazunobu Kondo, and Hirokazu Kameoka, "Online divergence switching for superresolution-based nonnegative matrix factorization," *Proceedings of 2014 RISP International Workshop on Nonlinear Circuits, Communications and Signal Processing (NCSP 2014)*, pp. 485–488, Hawaii, USA, March 2014 (Student Paper Award).
54. Tomo Miyauchi, **Daichi Kitamura**, Hiroshi Saruwatari, and Satoshi Nakamura, "Depth estimation of sound images using directional clustering and activation-shared nonnegative matrix factorization," *Proceedings of 2014 RISP International Workshop on Nonlinear Circuits, Communications and Signal Processing (NCSP 2014)*, pp. 437–440, Hawaii, USA, March 2014 (Student Paper Award).
55. **Daichi Kitamura**, Hiroshi Saruwatari, Kosuke Yagi, Kiyohiro Shikano, Yu Takahashi, and Kazunobu Kondo, "Robust music signal separation based on supervised nonnegative matrix factorization with prevention of basis sharing," *Proceedings of IEEE International Symposium on Signal Processing and Information Technology (ISSPIT 2013)*, pp. 392–397, Athens, Greece, December 2013.
56. **Daichi Kitamura**, Hiroshi Saruwatari, Kiyohiro Shikano, Kazunobu Kondo, and Yu Takahashi, "Music signal separation by supervised nonnegative matrix factorization with basis deformation," *Proceedings of IEEE 18th International Conference on Digital Signal Processing (DSP 2013)*, Santorini, Greece, July 2013.

57. **Daichi Kitamura**, Hiroshi Saruwatari, Yusuke Iwao, Kiyohiro Shikano, Kazunobu Kondo, and Yu Takahashi, "Superresolution-based stereo signal separation via supervised nonnegative matrix factorization," *Proceedings of IEEE 18th International Conference on Digital Signal Processing (DSP 2013)*, Santorini, Greece, July 2013.
58. **Daichi Kitamura**, Hiroshi Saruwatari, Kiyohiro Shikano, Kazunobu Kondo, and Yu Takahashi, "Regularized superresolution-based binaural signal separation with nonnegative matrix factorization," *Proceedings of 5th International Conference on 3D Systems and Applications (3DSA 2013)*, Osaka, Japan, June 2013.

## PATENTS

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1. **Daichi Kitamura** and Rui Watanabe, "SOUND PROCESSING METHODS AND APPARATUS," Japanese Unexamined Patent, Application No. 2020-33347 (submitted on February 28th, 2020), and Publication No. JP 2021-135446A (published on September 13th, 2021).
2. **Daichi Kitamura**, Yuki Kubo, Hiroshi Saruwatari, and Norihiro Takamune, "ACOUSTIC ANALYSIS APPARATUS, ACOUSTIC ANALYSIS METHOD, AND ACOUSTIC ANALYSIS PROGRAM," Japanese Unexamined Patent, Application No. 2019-220584 (submitted on December 5th, 2019), and Publication No. JP 2021-89388A (published on June 10th, 2021).
3. **Daichi Kitamura**, Hiroaki Nakajima, Hiroshi Saruwatari, Nobutaka Ono, Yu Takahashi, Kazunobu Kondo, Japanese Unexamined Patent, Application No. 2016-032489 (submitted on February 23rd, 2016) and Publication No. JP 2017-151228A (published on August 31st, 2017)..
4. **Daichi Kitamura**, Hiroshi Saruwatari, and Yu Takahashi, Japanese Unexamined Patent, Application No. 2013-094475 (submitted on April 26th, 2013), and Publication No. 2014-215544 (published on November 17th, 2014).
5. **Daichi Kitamura**, Hiroshi Saruwatari, and Yu Takahashi, Japanese Unexamined Patent, Application No. 2013-004375 (submitted on January 15th, 2013), and Publication No. 2014-137389 (published on July 28th, 2014).

## MISCELLANEOUS WORKS

---

1. **Daichi Kitamura**, "Blind audio source separation based on time-frequency structure models," Invited Overview Session in *Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC 2021)*, Tokyo, Japan, December 2021.
2. **Daichi Kitamura**, "The BEEtles! Let it "BEE" performed by four bees," *MATLAB EXPO 2021 Japan Lightning Talk*, June 10th, 2021.
3. Hiroshi Sawada, Nobutaka Ono, Hirokazu Kameoka, **Daichi Kitamura**, "Tutorial T-1 Blind audio source separation on tensor representation," *2018 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2018)*, April 16th, 2018.
4. **Daichi Kitamura**, "Blind source separation based on independent low-rank matrix analysis and its extensions," *Ohio State University, Invited Lecture*, December 15th, 2017.
5. **Daichi Kitamura**, "Dataset: songKitamura," *Dataset for Evaluation of Music Source Separation*, October 13th, 2017.
6. **Daichi Kitamura**, "Acoustic modeling in audio source separation," *The Acoustical Society of Japan, Summer Seminar, Invited Talk*, September 11th, 2017.
7. **Daichi Kitamura**, "Q. Why does a pickup affect on the tone of electric guitars?," *The Journal of the Acoustical Society of Japan (ASJ), Coffee Break, Q&A Corner*, vol. 73, no. 9, September, 2017 (in Japanese).
8. **Daichi Kitamura**, "Blind source separation based on independent low-rank matrix analysis and its extension to Student's  $t$ -distribution," *Télécom ParisTech, Invited Lecture*, September 4th, 2017.
9. **Daichi Kitamura**, "Audio source separation based on low-rank structure and statistical independence," *Nagoya University, Invited Lecture*, May 30th, 2017.
10. **Daichi Kitamura**, "Effective optimization algorithms for blind and supervised music source separation with nonnegative matrix factorization," *SOKENDAI (The Graduate University for Advanced Studies), Doctoral Dissertation*, March, 2017.

11. **Daichi Kitamura**, “History of independence-based blind source separation and independent low-rank matrix analysis,” *The University of Tokyo, Department of Information Physics and Computing, Invited Talk*, Tokyo, February 27th, 2017.
12. **Daichi Kitamura**, “Blind source separation based on statistical independence and low-rank matrix decomposition –Independent low-rank matrix analysis–,” *University of Tsukuba, Graduate School of Systems and Information Engineering, Multimedia Laboratory, Invited Talk*, Ibaraki, September 26th, 2016.
13. **Daichi Kitamura**, “Algorithms for independent low-rank matrix analysis,” *Supporting document*, August, 2016.
14. **Daichi Kitamura**, “Blind source separation based on independent low-rank matrix analysis,” *Speech PhD Summit 2016, Google inc. London, Invited Poster Presentation*, London, UK, Jun 15th, 2016.
15. **Daichi Kitamura**, Nobutaka Ono, “How can we listen only vocal or guitar sound from music? Mechanism in source separation and its capability,” *2016 National Institute of Informatics (NII) Open House*, no. E02, Tokyo, May, 2016.
16. **Daichi Kitamura**, “History of independent component analysis for sound media signal processing and its applications,” *Hitotsubashi University, Graduate School of International Corporate Strategy, MBA Program in Financial Strategy, Faculty Seminar, Invited Talk*, Tokyo, February 8th, 2016.
17. **Daichi Kitamura**, “Sound media signal processing for music,” *7th Hokuriku Union Acoustic Seminar, Beginner’s Meeting, Invited Talk*, Kanagawa, December 13th, 2015.
18. **Daichi Kitamura**, “Generative model in nonnegative matrix factorization and its application to multichannel sound source separation,” *Keio University, Science and Technology, Department of Electronics and Electrical Engineering, Yukawa Laboratory, Invited Talk*, Kanagawa, November 24th, 2015.
19. **Daichi Kitamura**, Nobutaka Ono, Hiroshi Sawada, Hirokazu Kameoka, Hiroshi Saruwatari, “How can we listen only vocal or guitar sound from music? Music source separation using nonnegative matrix factorization,” *2015 National Institute of Informatics (NII) Open House*, no. E02, Tokyo, June, 2015.