ShoichiKoyama

Curriculum Vitae

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Personal profile

Shoichi Koyama received his B.E., M.S, and Ph.D. degrees from the University of Tokyo, Tokyo, Japan, in 2007, 2009, and 2014, respectively. He is currently an Associate Professor at the National Institute of Informatics (NII), Tokyo, Japan. Prior to joining NII, he was a Researcher at Nippon Telegraph and Telephone Corporation (2009–2014), and Research Associate (2014–2018) and Lecturer (2018–2023) at the University of Tokyo, Tokyo, Japan. He was also a Visiting Researcher at Paris Diderot University (Paris 7), Institut Langevin, Paris, France (2016–2018), and a Visiting Associate Professor at Research Institute of Electrical Communication, Tohoku University, Miyagi, Japan (2020–2023). His research interests include audio signal processing/machine learning, acoustic inverse problems, and spatial audio.

Research topics

Acoustic signal processing, machine learning for audio, microphone and loudspeaker array processing, spatial audio

Professional experience

2023 Apr. – present **Associate Professor**, *The Graduate University for Advanced Studies (SOKENDAI)*, Tokyo, Japan
As a faculty staff of Graduate Institute for Advanced Studies

2023 Apr. – present **Associate Professor**, *National Institute of Informatics*, Tokyo, Japan
As a research staff of Digital Content and Media Sciences Research Division

2020 Apr. – 2023 Mar. **Visiting Associate Professor**, *Tohoku University*, Miyagi, Japan
As a lecturer at Research Institute of Electrical Communication

2018 Apr. – 2023 Mar. **Lecturer**, *The University of Tokyo*, Tokyo, Japan
As a faculty staff of Graduate School of Information Science and Technology

2016 Apr. – 2018 Mar. **Visiting researcher**, *Paris Diderot University (Paris 7) / Institut Langevin*, Paris, France
As a JSPS Overseas Research Fellow (Host researcher: Prof. Laurent Daudet)

2014 Apr. – 2018 Mar. **Research Associate**, *The University of Tokyo*, Tokyo, Japan
As a faculty staff of Graduate School of Information Science and Technology

2009 Apr. – 2014 Mar. **Researcher**, *Nippon Telegraph and Telephone Corp.*, Tokyo, Japan
Worked at NTT Media Intelligence Laboratories

Education

2014 Jan. **Ph.D. (Information Science and Technology)**, *The University of Tokyo*, Tokyo, Japan
Analytical approach to sound field recording and reproduction (Chief examiner: Prof. Shigeru Ando)

2007 Apr. – 2009 Mar. **M.S. in Information Physics and Computing**, *The University of Tokyo*, Tokyo, Japan
Acoustic source localization based on the weighted integral method (Supervisor: Prof. Shigeru Ando)

2003 Apr. – 2007 Mar. **B.E. in Mathematical Engineering and Information Physics**, *The University of Tokyo*, Tokyo, Japan
Signal processing using a new type of acoustic sensor (Supervisor: Prof. Shigeru Ando)

Honors and Awards

2025 **The Service Award for Editorial Activities**, *IEICE ESS*

2022 **The Activity Contribution Award**, *The Acoustical Society of Japan (ASJ)*

2021 **The Service Award (Operation of Technical Committee on Engineering Acoustics)**, *IEICE ESS*

2018 **The Research Award**, *Funai Foundation for Information Technology*

2015 **The Telecom System Technology Award**, *The Telecommunication Advancement Foundation*

2015 **The Itakura Prize Innovative Young Researcher Award**, *The Acoustical Society of Japan (ASJ)*

2011 **The Awaya Prize Young Researcher Award**, *The Acoustical Society of Japan (ASJ)*

2010 **The Best Young Researcher Paper Award**, *IEEJ Sensors and Micromachines Society*

2009 **The Young Researcher Award**, *SICE Measurement Division*

Peofessional Services

2026 Sep. **Plenary Lectures Chair**, *International Workshop on Acoustic Signal Enhancement (IWAENC) 2026*

2025 Oct. **Diversity and Inclusion Chairs**, *IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA) 2025*

2025 Jul. – present **Associate Editor**, *IEEE Signal Processing Letters*

2025 Jun. – present **Editorial Committee Member**, *Journal of Acoustical Society of Japan*

2024 Jan. – present **Associate Editor**, *IEEE Open Journal of Signal Processing*

2024 Jan. – present **Member**, *IEEE SPS Audio and Acoustic Signal Processing (AASP) Technical Committee*

2016 Jun. – present **Member**, *ASJ/IEICE Technical Committee on Electroacoustics/Engineering Acoustics*

2014 Dec. – present **Secretariat Member**, *Ultra-Realistic Communications Forum (URCF) Audio WG*

2023 Jun. – 2025 May **Editor in Field C**, *IEICE Trans. Fundamentals*

2019 Jun. – 2023 May **Associate Editor**, *IEICE Trans. Fundamentals*

2021 Jan. – 2022 Dec. **Treasurer**, *IEEE Signal Processing Society (SPS) Tokyo Joint Chapter*

2021 Jun. – 2022 May **Vice Chair**, *ASJ/IEICE Technical Committee on Electroacoustics/Engineering Acoustics*

2021 Dec. **Publication Co-Chair**, *13th Asia Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC 2021)*

2019 Jun. – 2021 May **Secretary**, *ASJ/IEICE Technical Committee on Electroacoustics/Engineering Acoustics*

2015 Jun. – 2021 May **Member**, *IEICE Technical Committee on Signal Processing*

2019 Jan. – 2019 Sep. **Guest Editor**, *Acoustical Science and Technology Special Issue on UAC 2018*

2018 Sep. **Finance Chair**, *International Workshop on Acoustic Signal Enhancement (IWAENC) 2018*

2015 Jun. – 2016 May **Assistant Secretary**, *ASJ/IEICE Technical Committee on Electroacoustics/Engineering Acoustics*

Funding

Principal investigator

2022–2029 **JST FOREST**, *Japan Science and Technology Agency*, Japan
Grant number: JPMJFR216M, Amount: 48,000,000 JPY

2022–2026 **JSPS KAKENHI Grant-in-Aid for Scientific Research (B)**, *Japan Society for Promotion of Science*, Japan
Grant number: 22H03608, Amount: 17,290,000 JPY

2018–2022 **JST PRESTO (Humans and Interactions)**, *Japan Science and Technology Agency*, Japan
Grant number: JPMJPR184J, Amount: 40,100,000 JPY

2018–2020 **FY2018 Excellent Young Resarcher of the University of Tokyo**, *The University of Tokyo*, Japan
Amount: 6,000,000 JPY

2016–2018 **JSPS Overseas Research Fellowships**, *Japan Society for the Promotion of Science*, Japan

2015–2019 **JSPS KAKENHI Grant-in-Aid for Young Scientists (A)**, *Japan Society for the Promotion of Science*, Japan
Grant number: 15H05312, Amount: 24,180,000 JPY

2015 **Research grant**, *Ono Acoustics Research Grant Foundation*, Japan
Amount: 1,000,000 JPY

2014–2015 **JSPS KAKENHI Grant-in-Aid for Young Scientists (Start-up)**, *Japan Society for the Promotion of Science*, Japan
Grant number: 26880003, Amount: 1,430,000 JPY

2014 **Overseas Travel Grant**, *The Telecomminications Advancement Foundation*, Japan
For attending International Workshop on Acoustic Signal Enhancement (IWAENC) 2014, Amount: 290,000 JPY

Co-investigator

2019–2022 **JSPS KAKENHI Grant-in-Aid for Scientific Research (A)**, *Japan Society for Promotion of Science*, Japan
Grant number: 19H01116, PI: Prof. Hiroshi Saruwatari

2016–2019 **JSPS KAKENHI Grant-in-Aid for Scientific Research (A)**, *Japan Society for the Promotion of Science*, Japan
Grant number: 16H01735, PI: Prof. Nobutaka Ono (National Institute of Informatics, Japan)

2014 **JSPS KAKENHI Grant-in-Aid for Scientific Research (A)**, *Japan Society for the Promotion of Science*, Japan
Grant number: 23240023, PI: Prof. Hiroshi Saruwatari (The University of Tokyo, Japan)

Teaching and mentoring experience

2023 Apr. – present **Supervision/supervision aid of students/interns**, *NII/SOKENDAI*, Tokyo, Japan
Mentored master and PhD students for their research

2023 Apr. – present **Introduction to Multimedia Information Science**, *SOKENDAI*, Tokyo, Japan
Introduction of acoustic signal processing research

2023 Apr. – present **Interactive Media**, *SOKENDAI*, Tokyo, Japan
Introduction of audio interactive systems for graduate students.

2023 Apr. – present **Fundamentals of Media Processing**, *SOKENDAI*, Tokyo, Japan
Introduction of (statistical) signal processing for graduate students.

2018 Apr. – 2023 Mar. **Information Physics and Computing Exercises III**, *The University of Tokyo*, Tokyo, Japan
Exercises of basic signal processing and algorithm for undergraduate students

2019 Feb. **PhD thesis examiner**, *Australian National University*, Canberra, Australia
Examined a PhD student of Australian National University

2019 Apr. – 2023 Mar. **Applied Acoustics**, *The University of Tokyo*, Tokyo, Japan
Physical acoustics and acoustic signal processing for undergraduate students.

2019 Oct. – 2022 Mar. **Basics of Modern Engineering I**, *The University of Tokyo*, Tokyo, Japan
Introduction of signal processing and its applications for undergraduate students.

2019 Oct. – 2023 Mar. **Advanced Topics of Acoustic Systems**, *The University of Tokyo*, Tokyo, Japan
Recent advancement of acoustic signal processing and its applications for graduate students.

2020 Apr. – 2023 Mar. **Signal Processing I**, *The University of Tokyo*, Tokyo, Japan
Basics of signal processing for undergraduate students.

2021 Mar. **PhD thesis examiner**, *Australian National University*, Canberra, Australia
Examined a PhD student of Australian National University

2018 Apr. – 2021 Mar. **Information Physics and Computing Exercises I**, *The University of Tokyo*, Tokyo, Japan
Exercises of basic physics for undergraduate students

2014 Apr. – 2016 Mar. **Student experiments**, *The University of Tokyo*, Tokyo, Japan
Basic experiments of acoustic signal processing and sensor circuits for undergraduate students

2014 Apr. – 2023 Mar. **Supervision/supervision aid of students**, *The University of Tokyo*, Tokyo, Japan
Mentored undergraduate, master, and PhD students for their research

2010 Aug. – 2013 Dec. **Supervision of research interns**, *Nippon Telegraph and Telephone Corp.*, Tokyo, Japan
Supervised undergraduate students from Keio University (Japan), University of British Columbia (Canada), and Georgia University of Technology (United States)

Publications

Journal papers

[1] Kazuyuki Arikawa, Shoichi Koyama, and Hiroshi Saruwatari. Spatial active noise control based on kernel interpolation with individual directional weighting. *APSIPA Transactions on Signal and Information Processing*, 14(1), 2025.

[2] Yuki Ito, Tomohiko Nakamura, Shoichi Koyama, Shuichi Sakamoto, and Hiroshi Saruwatari. Spatial upsampling of head-related transfer function using neural network conditioned on source position and frequency. *IEEE Open Journal of Signal Processing*, 6:1109–1123, 2025.

[3] Juliano G. C. Ribeiro, Shoichi Koyama, Ryosuke Horiuchi, and Hiroshi Saruwatari. Sound field estimation based on physics-constrained kernel interpolation adapted to environment. *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, 32:4369–4383, 2024.

[4] Juliano G. C. Ribeiro, Shoichi Koyama, and Hiroshi Saruwatari. Physics-constrained adaptive kernel interpolation for region-to-region acoustic transfer function: a bayesian approach. *EURASIP Journal on Audio, Speech, and Music Processing*, (43), 2024. **[Invited]**.

[5] Shoichi Koyama, Keisuke Kimura, and Natsuki Ueno. Weighted pressure and mode matching for sound field reproduction: Theoretical and experimental comparisons. *Journal of the Audio Engineering Society*, 71(4):173–185, 2023. **[Invited]**.

[6] Takumi Abe, Shoichi Koyama, Natsuki Ueno, and Hiroshi Saruwatari. Amplitude matching for multizone sound field control. *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, 31:656–669, 2023.

[7] Tomoya Nishida, Natsuki Ueno, Shoichi Koyama, and Hiroshi Saruwatari. Region-restricted sensor placement based on gaussian process for sound field estimation. *IEEE Transactions on Signal Processing*, 70:1718–1733, 2022.

[8] Juliano G. C. Ribeiro, Natsuki Ueno, Shoichi Koyama, and Hiroshi Saruwatari. Region-to-region kernel interpolation of acoustic transfer functions constrained by physical properties. *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, 30:2944–2954, 2022.

[9] Yuki Mitsufuji, Norihiro Takamune, Shoichi Koyama, and Hiroshi Saruwatari. Multichannel blind source separation based on evanescent-region-aware non-negative tensor factorization in spherical harmonic domain. *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, 29:607–617, 2021.

[10] Natsuki Ueno, Shoichi Koyama, and Hiroshi Saruwatari. Convex and differentiable formulation for inverse problems in hilbert spaces with nonlinear clipping effects. *IEICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences*, E104-A(9):1293–1303, 2021.

[11] Natsuki Ueno, Shoichi Koyama, and Hiroshi Saruwatari. Directionally weighted wave field estimation exploiting prior information on source direction. *IEEE Transactions on Signal Processing*, 69:2383–2395, 2021.

[12] Shoichi Koyama, Jesper Brunnström, Hayato Ito, Natsuki Ueno, and Hiroshi Saruwatari. Spatial active noise control based on kernel interpolation of sound field. *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, 29:3052–3063, 2021.

[13] Naoto Iijima, Shoichi Koyama, and Hiroshi Saruwatari. Binaural rendering from microphone array signals of arbitrary geometry. *Journal of the Acoustical Society of America*, 150(4):2479–2491, 2021.

[14] 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*, 28:49–60, 2020.

[15] Yuhta Takida, Shoichi Koyama, Natsuki Ueno, and Hiroshi Saruwatari. Reciprocity gap functional in spherical harmonic domain for gridless sound field decomposition. *Signal Processing, Elsevier*, 169, 2020.

[16] Shoichi Koyama and Laurent Daudet. Sparse representation of a spatial sound field in a reverberant environment. *IEEE Journal of Selected Topics in Signal Processing*, 13(1):172–184, 2019.

[17] Natsuki Ueno, Shoichi Koyama, and Hiroshi Saruwatari. Three-dimensional sound field reproduction based on weighted mode-matching method. *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, 27(12):1852–1867, 2019. **[IEEE SPS Japan Student Journal Paper Award]**.

[18] Naoki Murata, Shoichi Koyama, Norihiro Takamune, and Hiroshi Saruwatari. Sparse representation using multidimensional mixed-norm penalty with application to sound field decomposition. *IEEE Transactions on Signal Processing*, 66(12):3327–3338, 2018.

[19] Shoichi Koyama, Naoki Murata, and Hiroshi Saruwatari. Sparse sound field decomposition for super-resolution in recording and reproduction. *Journal of the Acoustical Society of America*, 143(6):3780–3895, 2018.

[20] Natsuki Ueno, Shoichi Koyama, and Hiroshi Saruwatari. Sound field recording using distributed microphones based on harmonic analysis of infinite order. *IEEE Signal Processing Letters*, 25(1):135–139, 2018.

[21] Shoichi Koyama, Ken'ichi Furuya, Keigo Wakayama, Suehiro Shimauchi, and Hiroshi Saruwatari. Analytical approach to transforming filter design for sound field recording and reproduction using circular arrays with a spherical baffle. *Journal of the Acoustical Society of America*, 139(3):1024–1036, 2016.

[22] Shoichi Koyama, Ken'ichi Furuya, Yoichi Haneda, and Hiroshi Saruwatari. Source-location-informed sound field recording and reproduction. *IEEE Journal of Selected Topics in Signal Processing*, 9(5):881–894, 2015.

[23] Yoichi Haneda, Ken'ichi Furuya, Shoichi Koyama, Kenta Niwa, and Kazunori Kobayashi. Sound field simulation for circular array based on spatial circular convolution. *Acoustical Science and Technology*, 35(2):99–107, 2014.

[24] Yoichi Haneda, Ken'ichi Furuya, Shoichi Koyama, and Kenta Niwa. Close-talking microphone arrays based on spherical harmonic expansion. *IEICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences*, J97-A(4):264–273, 2014. (in Japanese).

[25] Shoichi Koyama, Ken'ichi Furuya, Hisashi Uematsu, Yusuke Hiwasaki, and Yoichi Haneda. Real-time sound field transmission system by using wave field reconstruction filter and its evaluation. *IEICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences*, E97-A(9):1840–1848, 2014.

[26] Shoichi Koyama, Ken'ichi Furuya, Yusuke Hiwasaki, Yoichi Haneda, and Yôiti Suzuki. Wave field reconstruction filtering in cylindrical harmonic domain for with-height recording and reproduction. *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, 22(10):1546–1557, 2014.

[27] Jorge Trevino, Shoichi Koyama, Shuichi Sakamoto, and Yôiti Suzuki. Mixed-order ambisonics encoding of cylindrical microphone array signals. *Acoustical Science and Technology, Acoustical Letters*, 35(3):174–177, 2014.

[28] Shoichi Koyama, Ken'ichi Furuya, Yusuke Hiwasaki, and Yoichi Haneda. Analytical approach to wave field reconstruction filtering in spatio-temporal frequency domain. *IEEE Transactions on Audio, Speech, and Language Processing*, 21(4):685–696, 2013.

[29] Shoichi Koyama, Ken'ichi Furuya, Yusuke Hiwasaki, and Yoichi Haneda. Reproducing virtual sound sources in front of a loudspeaker array using inverse wave propagator. *IEEE Transactions on Audio, Speech, and Language Processing*, 20(6):1746–1758, 2012. **[The Telecom System Technology Award, the Telecommunication Advancement Foundation]**.

[30] Shoichi Koyama, Toru Kurihara, and Shigeru Ando. A theory and experiment of instantaneous wave source localization from a wave distribution on a small region. *IEEJ Transactions of Sensors and Micromachines*, 129-E(10):350–356, 2009. (in Japanese). **[The Best Young Researcher Paper Award, IEEJ Sensors and Micromachines Society]**.

Books

[1] Natsuki Ueno and Shoichi Koyama. *Sound Field Estimation: Theories and Applications (Foundations and Trends® in Signal Processing)*, volume 19. Now Publishers, 2025.

Overview / Tutorial papers

[1] Shoichi Koyama. Sound field recording and control. *The Journal of the Institute of Electrical and Information Engineers, Japan*, 109(1), Jan. 2026. (in Japanese).

[2] Shoichi Koyama, Juliano G. C. Ribeiro, Tomohiko Nakamura, Natsuki Ueno, and Mirco Pezzoli. Physics-informed machine learning for sound field estimation: Fundamentals, state of the art, and challenges. *IEEE Signal Processing Magazine*, 41(6):60–71, 2025.

[3] Shoichi Koyama. Fundamentals of spatial active noies control: From point control to region control. *Journal of the Acoustical Society of Japan*, 80(5):274–281, 2024. (in Japanese).

[4] Shoichi Koyama. Sparsity-based sound field reconstruction. *Acoustical Science and Technology*, 41(1):269–275, 2020.

[5] Shoichi Koyama, Gilles Chardon, and Laurent Daudet. Optimizing source and sensor placement for sound field control: An overview. *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, 28:686–714, 2020.

[6] Shoichi Koyama. The future of sound recording, reproduction, and editing. *Journal of IEICE*, 100(6):474–478, 2017. (in Japanese).

[7] Shoichi Koyama. Sparse sound field representation for super-resolution in recording and reproduction. *Journal of the Acoustical Society of Japan*, 71(11):632–638, 2015. (in Japanese).

[8] Ken'ichi Furuya and Shoichi Koyama. Wave field synthesis; principles and applications. *Journal of the Institute of Image Information and Television Engineers*, 68(8):621–624, 2014. (in Japanese).

[9] Shoichi Koyama. Mathematical formulation of sound field reproduction – mathematics in wave field synthesis and higher order ambisonics–. *Journal of the Acoustical Society of Japan*, 68(11):584–589, 2012. (in Japanese).

Conference papers

[1] Shoichi Koyama, Enzo De Sena, Prasanga Samarasinghe, Mark R. P. Thomas, and Fabio Antonacci. Past, present, and future of spatial audio and room acoustics. In *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Hyderabad, Apr. 2025. **[Invited]**.

[2] Kota Yamano, Shoichi Koyama, and Hiroshi Saruwatari. Active noise cancellation in space containing scattering objects based on kernel interpolation. In *International Congress on Acoustics (ICA)*, New Orleans, May 2025. **[Invited]**.

[3] Shoichi Koyama and Kenji Ishizuka. Learning magnitude distribution of sound fields via conditioned autoencoder. In *Proceedings of Forum Acusticum*, Málaga, Jun. 2025. **[Invited]**.

[4] Riccardo Giampiccolo, Alessandro Ilic Mezza, Mirco Pezzoli, Shoichi Koyama, Alberto Bernardini, and Fabio Antonacci. Modeling the impulse response of higher-order microphone arrays using differentiable feedback delay networks. In *Proceedings of Inernational Conference on Digital Audio Effects (DAFx25)*, Sep. 2025.

[5] Ryan Niu, Shoichi Koyama, and Tomohiko Nakamura. Head-related transfer function individualization using anthropometric features and spatially independent latent representation. In *Proceedings of IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, Oct. 2025.

[6] Shihori Kozuka, Shoichi Koyama, Hiroaki Itou, and Noriyoshi Kamado. Source and sensor placement for sound field control based on mean square error with prior spatial covariance. In *Proceedings of IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, Oct. 2025. **[Spotlight]**.

[7] Mirco Pezzoli, Federico Miotello, Shoichi Koyama, and Fabio Antonacci. Low-rank adaptation of deep prior neural networks for sound field reconstruction.

In *Proceedings of IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, Oct. 2025.

[8] Denny Hermawanto and Shoichi Koyama. Towards a practical system of spatial active noise control using kernel interpolation. In *Joint Meeting of the Acoustical Society of America and Acoustical Society of Japan*, Honolulu, Dec 2025.

[9] Yoshihide Tomita, Shoichi Koyama, and Hiroshi Saruwatari. Localizing acoustic energy in sound field synthesis by directionally weighted exterior radiation suppression. In *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, pages 321–325, Seoul, Republic of Korea, Apr. 2024.

[10] Shihori Kozuka, Shoichi Koyama, Hiroaki Itou, and Noriyoshi Kamado. Sound field estimation in region including scattering objects based on kernel interpolation: Evaluation for various scatterers. In *Proceedings of International Workshop on Acoustic Signal Enhancement (IWAENC)*, pages 324–328, Sep. 2024.

[11] David Sundström, Shoichi Koyama, and Andreas Jakobsson. Sound field estimation using deep kernel learning regularized by the wave equation. In *Proceedings of International Workshop on Acoustic Signal Enhancement (IWAENC)*, pages 319–323, Sep. 2024.

[12] Kazuyuki Arikawa, Shoichi Koyama, and Hiroshi Saruwatari. Spatial active noise control method based on sound field interpolation from reference microphone signals. In *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Rhodes island, Greece, Jun. 2023.

[13] Juliano G. C. Ribeiro, Shoichi Koyama, and Hiroshi Saruwatari. Kernel interpolation of acoustic transfer functions with adaptive kernel for directed and residual reverberations. In *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Rhodes island, Greece, Jun. 2023.

[14] Takaaki Kojima, Kazuyuki Arikawa, Shoichi Koyama, and Hiroshi Saruwatari. Multichannel active noise control with exterior radiation suppression based on riemannian optimization. In *Proceedings of European Signal Processing Conference (EUSIPCO)*, pages 96–100, Helsinki, Finland, Sep. 2023.

[15] Keisuke Kimura, Shoichi Koyama, and Hiroshi Saruwatari. Perceptual quality enhancement of sound field synthesis based on combination of pressure and amplitude matching. In *Proceedings of IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, Oct. 2023.

[16] Shoichi Koyama, Masaki Nakada, Juliano G. C. Ribeiro, and Hiroshi Saruwatari. Kernel interpolation of incident sound field in region including scattering objects. In *Proceedings of IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, Oct. 2023.

[17] Kazuyuki Arikawa, Shoichi Koyama, and Hiroshi Saruwatari. Spatial active noise control based on individual kernel interpolation of primary and secondary sound fields. In *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, pages 1056–1060, Singapore, May 2022.

[18] Juliano G. C. Ribeiro, Shoichi Koyama, and Hiroshi Saruwatari. Region-to-region kernel interpolation of acoustic transfer function with directional weighting. In

Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), pages 576–580, Singapore, May 2022. **[Certified Chapter Student Travel Grant]**.

[19] Jesper Brunnström, Shoichi Koyama, and Marc Moonen. Variable span trade-off filter for sound zone control with kernel interpolation weighting. In *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, pages 1071–1075, Singapore, May 2022.

[20] Kazuhide Shigemi, Shoichi Koyama, Tomohiko Nakamura, and Hiroshi Saruwatari. Physics-informed convolutional neural network with bicubic spline interpolation for sound field estimation. In *Proceedings of International Workshop on Acoustic Signal Enhancement (IWAENC)*, Sep. 2022.

[21] Yuki Ito, Tomohiko Nakamura, Shoichi Koyama, and Hiroshi Saruwatari. Head-related transfer function interpolation from spatially sparse measurements using autoencoder with source position conditioning. In *Proceedings of International Workshop on Acoustic Signal Enhancement (IWAENC)*, Sep. 2022. **[Best Student Paper Award Nominees]**.

[22] Kazuyuki Arikawa, Shoichi Koyama, and Hiroshi Saruwatari. Kernel-interpolation-based spatial active noise control with exterior radiation suppression. In *Proceedings of International Congress on Acoustics (ICA)*, Gyeongju, Republic of Korea, Oct. 2022. **[Invited]**.

[23] Shoichi Koyama and Kazuyuki Arikawa. Weighted pressure matching based on kernel interpolation for sound field reproduction. In *Proceedings of International Congress on Acoustics (ICA)*, Gyeongju, Republic of Korea, Oct. 2022. **[Invited]**.

[24] Jesper Brunnström and Shoichi Koyama. Kernel-interpolation-based filtered-x least mean square for spatial active noise control in time domain. In *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, pages 161–165, Jun. 2021.

[25] Shoichi Koyama, Takashi Amakasu, Natsuki Ueno, and Hiroshi Saruwatari. Amplitude matching: Majorization-minimization algorithm for sound field control only with amplitude constraint. In *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, pages 411–415, Jun. 2021.

[26] Shoichi Koyama, Keisuke Kimura, and Natsuki Ueno. Sound field reproduction with weighted mode matching and infinite-dimensional harmonic analysis: An experimental evaluation. In *Proceedings of International Conference on Immersive and 3D Audio (I3DA)*, Bologna, Sep. 2021. **[Invited]**.

[27] Shoichi Koyama, Tomoya Nishida, Keisuke Kimura, Takumi Abe, Natsuki Ueno, and Jesper Brunnström. Meshrir: A dataset of room impulse responses on meshed grid points for evaluating sound field analysis and synthesis methods. In *Proceedings of IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, pages 151–155, Oct. 2021.

[28] Ryosuke Horiuchi, Shoichi Koyama, Juliano G. C. Ribeiro, Natsuki Ueno, and Hiroshi Saruwatari. Kernel learning for sound field estimation with l1 and l2 regularizations. In *Proceedings of IEEE Workshop on Applications of Signal Processing to*

Audio and Acoustics (WASPAA), pages 261–265, Oct. 2021. **[NEC C&C Foundation, Grants for Researchers Attending International Conferences, Outstanding Paper Award for Young C&C Researchers]**.

[29] Keisuke Kimura, Shoichi Koyama, Natsuki Ueno, and Hiroshi Saruwatari. Mean-square-error-based secondary source placement in sound field synthesis with prior information on desired field. In *Proceedings of IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA)*, pages 281–285, Oct. 2021.

[30] Hayato Ito, Shoichi Koyama, Natsuki Ueno, and Hiroshi Saruwatari. Spatial active noise control based on kernel interpolation with directional weighting. In *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, pages 8399–8403, May 2020. **[Invited]**.

[31] Kentaro Ariga, Tomoya Nishida, Shoichi Koyama, Natsuki Ueno, and Hiroshi Saruwatari. Mutual-information-based sensor placement for spatial sound field recording. In *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, pages 166–170, May 2020.

[32] Juliano G. C. Ribeiro, Natsuki Ueno, Shoichi Koyama, and Hiroshi Saruwatari. Kernel interpolation of acoustic transfer function between regions considering reciprocity. In *Proceedings of IEEE Sensor Array and Multichannel Signal Processing Workshop (SAM)*, Jun. 2020.

[33] Naoto Iijima, Shoichi Koyama, and Hiroshi Saruwatari. Binaural rendering from distributed microphone signals considering loudspeaker distance in measurements. In *Proceedings of IEEE International Workshop on Multimedia Signal Processing (MMSP)*, Tampere, Sep. 2020.

[34] Tomoya Nishida, Natsuki Ueno, Shoichi Koyama, and Hiroshi Saruwatari. Sensor placement in arbitrarily restricted region for field estimation based on gaussian process. In *Proceedings of European Signal Processing Conference (EUSIPCO)*, pages 2289–2293, Amsterdam, Jan. 2020.

[35] Gilles Chardon, Shoichi Koyama, and Laurent Daudet. Numerical evaluation of source and sensor placement methods for sound field control. In *Proceedings of Forum Acusticum*, Lyon, Dec. 2020.

[36] Yuhta Takida, Shoichi Koyama, Natsuki Ueno, and Hiroshi Saruwatari. Robust gridless sound field decomposition based on structured reciprocity gap functional in spherical harmonic domain. In *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, pages 581–585, Brighton, May 2019.

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Other talks

[1] Shoichi Koyama and Mirco Pezzoli. Physics-informed machine learning in sound field estimation: Fundamentals, state of the art, and challenges. In *IEEE Signal Processing Society SLTC/AASP TC Webinar*, Jun. 2025.

[2] Shoichi Koyama. Neural spatial audio processing for sound field analysis and control. In *Audio Analysis Workshop, keynote talk*, Aug. 2025.

[3] Mirco Pezzoli, Diego Di Carlo, and Shoichi Koyama. Physics-informed machine learning for audio processing. In *European Signal Processing Conference (EUSIPCO), Tutorial*, Isola delle Femmine - Palermo, Sep. 2025.

[4] Shoichi Koyama. Physics-informed machine learning for sound field estimation and control. In *Polytechnic Uniersity of Milan, seminar talk*, Sep. 2024.

[5] Shoichi Koyama. Physics-informed machine learning for sound field estimation and control. In *Technical University of Denmark, seminar talk*, Sep. 2024.

[6] Shoichi Koyama. Physics-informed machine learning for sound field estimation and control. In *Lund University, seminar talk*, Sep. 2024.

[7] Shoichi Koyama. Capturing and reproducing spatial sound: Physics-based approach to vr/ar audio. In *Multiple Input Modalities and Sensations for VR/AR Interactions (MIMSVAI, in conjunction with UbiComp/ISWC), Keynote talk*, Oct. 2024.

[8] Shoichi Koyama. Physics-informed machine learning for sound field estimation and control. In *The Australian National University, seminar talk*, Oct. 2024.

[9] Shoichi Koyama. Audio processing technology for delivering sounds you want to hear and preventing sounds you don't want to hear. In *13th US-Japan Hi-Tech Industrialization Forum*, Dec. 2024.

[10] Shoichi Koyama. Sound field analysis and synthesis: Recent advances and applications to spatial audio. In *Aalto University, Acoustics Lab, seminar talk*, Sep. 2023.

[11] Shoichi Koyama and Natsuki Ueno. Sound field estimation: Recent advances and applications. In *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), Tutorial*, Singapore, May 2022.

[12] Shoichi Koyama. Sound field analysis and synthesis: Theoretical advances and applications to spatial audio reproduction. In *Asia-Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA ASC), Overview Session*, Dec. 2021.

[13] Natsuki Ueno and Shoichi Koyama. Infinite-dimensional expansion for sound field estimation with application to spatial audio. In *IEEE Signal Processing Society Webinar*, Dec. 2021.

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[15] Shoichi Koyama. Sound field recording and reproduction using small number of microphones and loudspeakers. In *University of Southampton, Institute of Sound and Vibration Research (ISVR), seminar talk*, Jul. 2017.

[16] Shoichi Koyama. Sound field recording and reproduction and its extension to super-resolution. In *IEEE NZ North Section Technical seminar, University of Auckland*, Apr. 2015.

[17] Shoichi Koyama. Sound field recording and reproduction and its extension to super-resolution. In *IEEE NZ Central Section Invited Lecture, Victoria University of Wellington*, Apr. 2015.

Professional memberships

IEEE, *Senior Member*
Acoustical Society of America (ASA), *Member*
Audio Engineering Society (AES), *Member*
Acoustical Society of Japan (ASJ), *Member*
IEICE, *Member*

Technical skills

Programming Python, Matlab, C/C++, PHP, HTML, CSS

Languages

Japanese	Native speaker
English	Proficient
French	Basic