# Tomohiko Nakamura

2-4-7 Aomi, Koto-ku, Tokyo, Japan 135-0064
🌐 https://tomohikonakamura.github.io/Tomohiko-Nakamura/
✉ tomohiko.nakamura.jp@ieee.org
 https://github.com/TomohikoNakamura

## Research Interests

Signal-processing-inspired deep learning, audio and music signal processing, and machine learning

## Job

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|---|---|
| **Senior Researcher** | Apr. 2023–Present |
| *The National Institute of Advanced Industrial Science and Technology (AIST), Japan.* | |
| **Project Research Associate** | Sept. 2019–Mar. 2023 |
| *Graduate School of Information Science and Technology, The University of Tokyo, Japan.* | |
| **Researcher** | Apr. 2016–Aug. 2019 |
| *Intelligent Systems Laboratory, SECOM, Japan.* | |
| **Research Fellow (DC2)** | Apr. 2015–Mar. 2016 |
| *Japan Society for the Promotion of Science (JSPS), Japan.* | |

## Education

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| **Ph.D. degree in Information Science and Technology** | Mar. 2016 |
| *Graduate School of Information Science and Technology, The University of Tokyo, Japan.* | |
| **Master's degree in Information Science and Technology** | Mar. 2013 |
| *Graduate School of Information Science and Technology, The University of Tokyo, Japan.* | |
| **Bachelor's degree in Engineering** | Mar. 2011 |
| *Faculty of Engineering, The University of Tokyo, Japan.* | |

## Teaching

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|---|---|
| **Applied Gaussian Process and Machine Learning** | 6, Dec. 2021 |
| *Graduate School of Information Science and Technology, The University of Tokyo, Japan.* | |
| **Advanced Signal Processing** | 23, June 2020 and 21, June 2022, June 2024 |
| *Graduate School of Information Science and Technology, The University of Tokyo, Japan.* | |
| **Student Experiment** | Apr. 2020–Mar. 2023 |
| *Department of Mathematical engineering and information physics, The University of Tokyo, Japan.* | |

## Languages

Japanese (native), English (basic)

## Competitive Funds

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| **Development of deep-layered analysis-by-synthesis techniques for acoustic scene analysis with human intervention** | |
| *JSPS KAKENHI* | *Apr. 2023–Mar. 2027* |
| **Sampling-frequency-independent deep learning for audio media processing** | |
| *JST ACT-X (Frontier of Mathematics and Information Science)* | *Oct. 2021–Mar. 2024* |
| **Research on acoustic scene analysis by integrating time-domain deep learning and multiresolution analysis** | |
| *JSPS KAKENHI* | *Apr. 2020–Mar. 2023* |

+ 3 funds as representative and 5 funds as co-researcher.

# Publications

## Journal Papers

[1] Yusaku Mizobuchi, Daichi Kitamura, <u>Tomohiko Nakamura</u>, Norihiro Takamune, Hiroshi Saruwatari, Yu Takahashi, and Kazunobu Kondo, "Music bleeding-sound reduction based on time-channel nonnegative matrix factorization," *APSIPA Transactions on Signal and Information Processing*, Jul. 2025.

[2] Yuto Ishikawa, <u>Tomohiko Nakamura</u>, Norihiro Takamune, Daichi Kitamura, Hiroshi Saruwatari, Yu Takahashi, and Kazunobu Kondo, "Real-time speech extraction based on rank-constrained spatial covariance matrix estimation and spatially regularized independent low-rank matrix analysis with fast demixing matrix estimation," *IEEE Access*, vol. 13, pp. 88683–88706, May 2025.

[3] Kanami Imamura, <u>Tomohiko Nakamura</u>, Kohei Yatabe, and Hiroshi Saruwatari, "Neural analog filter for sampling-frequency-independent convolutional layer," *APSIPA Transactions on Signal and Information Processing*, vol. 13, no. 1, e28, Nov. 2024.

[4] Takaaki Saeki, Shinnosuke Takamichi, <u>Tomohiko Nakamura</u>, Naoko Tanji, and Hiroshi Saruwatari, "SelfRemaster: Self-supervised speech restoration for historical audio resources," *IEEE Access*, vol. 11, pp. 144831–144843, Jan. 2024.

[5] +7 papers

## Peer-Reviewed International Conferences and Workshops

[1] Ryan Niu, Shoichi Koyama, and <u>Tomohiko Nakamura</u>, "Head-related transfer function individualization using anthropometric features and spatially independent latent representations," in *Proceedings of IEEE Workshop on Applications of Signal Processing to Audio and Acoustics*, Oct. 2025.

[2] Hitoshi Suda, Junya Koguchi, Shunsuke Yoshida, <u>Tomohiko Nakamura</u>, Fukayama Satoru, and Jun Ogata, "IdolSongsJp corpus: A multi-singer song corpus in the style of Japanese idol groups," in *Proceedings of International Society for Music Information Retrieval Conference*, Sep. 2025.

[3] Kanami Imamura, <u>Tomohiko Nakamura</u>, Norihiro Takamune, Kohei Yatabe, and Hiroshi Saruwatari, "Local equivariance error-based metrics for evaluating sampling-frequency-independent property of neural network," in *Proceedings of European Signal Processing Conference*, Sep. 2025.

[4] +39 papers

## Invited Talks

[1] <u>Tomohiko Nakamura</u>, "Trends and prospects for audio source separation using deep learning," *Meeting on Technical Committee on Engineering Acoustics, IEICE*, Mar. 2025. (in Japanese)

[2] Daichi Kitamura, <u>Tomohiko Nakamura</u>, "Fundamentals and applications of audio source separation — A guide to becoming an expert," *2023 Otogaku Symposium*, Jun. 2023. (in Japanese)

[3] <u>Tomohiko Nakamura</u>, "Signal-processing-inspired deep learning," *IEEE NZ Signal Processing/Information Theory Joint Chapter in co-hosted by the Acoustics Research Centre, University of Auckland*, Dec. 2022.

[4] +1 invited presentation

## Overview Papers

[1] Shoichi Koyama, Juliano Ribeiro, <u>Tomohiko Nakamura</u>, Natsuki Ueno, and Mirco Pezzoli, "Physics-informed machine learning for sound field estimation: Fundamentals, state of the art, and challenges," *Special Issue on Model-Based and Data-Driven Audio Signal Processing, IEEE Signal Processing Magazine*, vol. 41, pp. 60–71, 2024.

[2] Hirokazu Kameoka, <u>Tomohiko Nakamura</u>, and Norihiro Takamune, "Recent advances in music signal processing techniques," *The Journal of Institute of Electronics, Information and Communication Engineers*, vol. 98, no. 6, pp. 467–474, Jun. 2015. (in Japanese)

## Patents

[1] <u>Tomohiko Nakamura</u>, "Object recognition device, method, and program," Japan Patent JP7349288, 13-Sep-2023.

[2] <u>Tomohiko Nakamura</u>, "Object recognition device, method, and program," Japan Patent JP7349290, 13-Sep-2023.

[3] +8 patents

# Awards

1. The Awaya Kiyoshi Research Award, ASJ, Mar. 2024.
2. The Itakura Prize Innovative Young Researcher Award, ASJ, Mar. 2022.
3. Dean's Award of Graduate School of Information Science and Technology, The University of Tokyo, Mar. 2016.
4. +11 awards