Tomohiko Nakamura

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Research Interests

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

Job

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

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

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

Variable-resolution audio processing framework adapted to acoustic scenes
JSPS PRESTO (Fundamental Innovation for Real-World Intelligent Systems) — *Apr. 2023–Mar. 2027*

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*

+ 4 funds as representative, 5 funds as co-researcher, and 1 fund as research participants.

Publications

Journal Papers

[1] 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*, Sept. 2025.

[2] Yusaku Mizobuchi, Daichi Kitamura, Tomohiko Nakamura, 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*, vol. 14, no. 1, e18, July 2025.

[3] Yuto Ishikawa, Tomohiko Nakamura, 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.

[4] Kanami Imamura, Tomohiko Nakamura, 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.

[5] +8 papers

Peer-Reviewed International Conferences and Workshops

[1] Go Nishikawa, Wataru Nakata, Yuki Saito, Kanami Imamura, Hiroshi Saruwatari, and Tomohiko Nakamura, "Multi-sampling-frequency naturalness MOS prediction using self-supervised learning model with sampling-frequency-independent layer," in *Proceedings of IEEE Automatic Speech Recognition and Understanding Workshop*, Dec. 2025. (First and second authors contributed equally.)

[2] Rinka Nobukawa, Makito Kitamura, Tomohiko Nakamura, Shinnosuke Takamichi, and Hiroshi Saruwatari, "Drum-to-vocal percussion sound conversion and its evaluation methodology," in *Proceedings of Asia Pacific Signal and Information Processing Association Annual Summit and Conference*, Oct. 2025.

[3] Ryan Niu, Shoichi Koyama, and Tomohiko Nakamura, "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.

[4] +37 papers

Invited Talks

[1] Tomohiko Nakamura, "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, Tomohiko Nakamura, "Fundamentals and applications of audio source separation — A guide to becoming an expert," *2023 Otogaku Symposium*, Jun. 2023. (in Japanese)

[3] Tomohiko Nakamura, "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, Tomohiko Nakamura, 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, Tomohiko Nakamura, 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] Tomohiko Nakamura, "Object recognition device, method, and program," Japan Patent JP7349288, 13-Sept-2023.

[2] Tomohiko Nakamura, "Object recognition device, method, and program," Japan Patent JP7349290, 13-Sept-2023.

[3] +9 patents

Awards

1. The Awaya Kiyoshi Research Award, ASJ, Mar. 2024.
2. The Itakura Prize Innovative Young Researcher Award, ASJ, Mar. 2022.
3. +12 awards