# 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

**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**
*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

**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 received as representative, 4 funds received as co-researcher, and 3 travel grants.

## Publications

### Journal Papers

[1] Takaaki Saeki, Shinnosuke Takamichi, Tomohiko Nakamura, Naoko Tanji, and Hiroshi Saruwatari, "SelfRemaster: Self-supervised speech restoration for historical audio resources," *IEEE Access*, Jan. 2024. (to appear)

[2] Takuya Hasumi, Tomohiko Nakamura, Norihiro Takamune, Hiroshi Saruwatari, Daichi Kitamura, Yu Takahashi, and Kazunobu Kondo, "PoP-IDLMA: Product-of-prior independent deeply learned matrix analysis for multichannel music source separation," *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, vol. 31, pp. 2680–2694, Jul. 2023.

[3] Koichi Saito, Tomohiko Nakamura, Kohei Yatabe, and Hiroshi Saruwatari, "Sampling-frequency-independent convolutional layer and its application to audio source separation," *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, vol. 30, pp. 2928–2943, Sep. 2022.

[4] Tomohiko Nakamura, Shihori Kozuka, and Hiroshi Saruwatari, "Time-domain audio source separation with neural networks based on multiresolution analysis," *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, vol. 29, pp. 1687–1701, Apr. 2021.

[5] +4 papers

### Peer-Reviewed International Conferences

[1] Kanami Imamura, Tomohiko Nakamura, Norihiro Takamune, Kohei Yatabe, and Hiroshi Saruwatari, "Algorithms of sampling-frequency-independent layers for non-integer strides," in *Proceedings of European Signal Processing Conference*, Sep. 2023, pp. 326–330.

[2] Joonyong Park, Shinnosuke Takamichi, Tomohiko Nakamura, Kentaro Seki, Detai Xin, and Hiroshi Saruwatari, "How generative spoken language model encodes noisy speech: Investigation from phonetics to syntactics," in *Proceedings of INTERSPEECH*, Aug. 2023, pp. 1085–1089.

[3] Tomohiko Nakamura, Shinnosuke Takamichi, Naoko Tanji, Satoru Fukayama, and Hiroshi Saruwatari, "jaCappella corpus: A japanese a cappella vocal ensemble corpus," in *Proceedings of IEEE International Conference on Acoustics, Speech, and Signal Processing*, Jun. 2023.

[4] Kota Arai, Yutaro Hirao, Takuji Narumi, Tomohiko Nakamura, Shinnosuke Takamichi, and Shigeo Yoshida, "TimToShape: Supporting practice of musical instruments by visualizing timbre with 2D shapes based on crossmodal correspondences," in *Proceedings of ACM Conference on Intelligent User Interfaces*, Mar. 2023, pp. 850–865.

[5] +24 papers

### Patents

[1] Rintaro Ikeshita, Tomohiro Nakatani, Naoki Narisawa, Norihiro Takamune, Tomohiko Nakamura, and Hiroshi Saruwatari, "Signal processing device, method, and program," Japan Unexamined Patent JP2023-089431, 16-Dec-2021.

[2] Tomohiko Nakamura, "Trained model, training device, training method, and training program," Japan Patent JP7304235, 16-Aug-2019.

[3] +8 patents

### Invited Talks

[1] Daichi Kitamura, Tomohiko Nakamura, "Fundamentals and Applications of Audio Source Separation — A Guide to Becoming an Expert," *2023 Otogaku Symposium*, Jun. 2023. (in Japanese)

[2] 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.

[3] Tomohiko Nakamura, "Audio source separation combining wavelet transform and deep neural network," *Meeting on Technical Committee on Engineering Acoustics, IEICE*, Nov. 2022. (in Japanese)

## Awards

1. The Itakura Prize Innovative Young Researcher Award, ASJ, Mar. 2022.
2. Dean's Award of Graduate School of Information Science and Technology, The University of Tokyo, Mar. 2016.
3. IPSJ Yamashita SIG Research Award, Mar. 2016.
4. +10 awards and 10 awards received by my students and collaborators