

Tomohiko Nakamura

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

Education

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

Teaching

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

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 <i>JSPS KAKENHI</i> | Apr. 2023–Mar. 2027 |
| Sampling-frequency-independent deep learning for audio media processing <i>JST ACT-X (Frontier of Mathematics and Information Science)</i> | Oct. 2021–Mar. 2024 |
| Research on acoustic scene analysis by integrating time-domain deep learning and multiresolution analysis <i>JSPS KAKENHI</i> | Apr. 2020–Mar. 2023 |
| + 3 funds as representative and 5 funds as co-researcher. | |

Publications

Journal Papers.....

- [1] 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*, May 2025.
- [2] 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.
- [3] Takaaki Saeki, Shinnosuke Takamichi, Tomohiko Nakamura, Naoko Tanji, and Hiroshi Saruwatari, "SelfRemaster: Self-supervised speech restoration for historical audio resources," *IEEE Access*, vol. 11, pp. 144831–144843, Jan. 2024.
- [4] 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.

[5] +6 papers

Peer-Reviewed International Conferences and Workshops.....

- [1] Aogu Wada, Tomohiko Nakamura, and Saruwatari Hiroshi, "Hyperbolic embeddings for order-aware classification of audio effect chains," in *Proceedings of International Conference on Digital Audio Effects*, Sep. 2025.
- [2] Yuto Ishikawa, Tomohiko Nakamura, Norihiro Takamune, and Hiroshi Saruwatari, "Hearing-aids system using distributed assistive device and blind speech extraction method under diffuse noise," in *International Congress on Acoustics*, May 2025.
- [3] Tomohiko Nakamura, Kwanghee Choi, Keigo Hojo, Yoshiaki Bando, Satoru Fukayama, and Shinji Watanabe, "Discrete speech unit extraction via independent component analysis," in *SALMA: Speech and Audio Language Models - Architectures, Data Sources, and Training Paradigms, IEEE International Conference on Acoustics, Speech, and Signal Processing Workshops*, Apr. 2025.

[4] +36 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 Otagaku 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-Sep-2023.
- [2] Tomohiko Nakamura, "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