

Tomohiko Nakamura

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🌐 <http://tomohikonakamura.github.io/Tomohiko-Nakamura/>

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Research Interests

DSP-inspired deep learning, audio signal processing, music information processing, machine learning, and image processing.

Job

Project Research Associate

Sept. 2019–Present

*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.*

M.S. degree in Information Science and Technology

Mar. 2013

*Graduate School of Information Science and Technology,
The University of Tokyo, Japan.*

B.S. degree in Engineering

Mar. 2011

Faculty of Engineering, The University of Tokyo, Japan.

Teaching

Student Experiment

Apr. 2020–Present

*Department of Mathematical engineering and information physics,
The University of Tokyo, Japan.*

I lecture active and passive measurement for 3D reconstruction from images (in Japanese).

Advanced Signal Processing

23, June 2020

*Graduate School of Information Science and Technology,
The University of Tokyo, Japan.*

I lecture about music information processing (in Japanese).

Skills

- Languages: Japanese (native) and English (basic)
- Programming: Python, C/C++, Golang, Matlab, Javascript, HTML

Competitive Funds

Research Funds.....

JSPS KAKENHI (Grant No. 20K19818)

Japan Society of the Promotion of Science (JSPS)

Research representative

Apr. 2020–Present

JSPS KAKENHI (Grant No. 19H01116)

Japan Society of the Promotion of Science (JSPS)

Co-researcher

Apr. 2020–Present

Research Grant (A)

The Tateisi Science and Technology Foundation

Research representative

Apr. 2020–Mar. 2021

2020 Research Grant for Sound Technology Promotion

Kawai Foundation for Sound Technology and Music

Research representative

Apr. 2020–Mar. 2021

Grant-in-Aid for JSPS Fellows (Grant No. 15J09992)

Japan Society of the Promotion of Science (JSPS)

Research representative

Apr. 2015–Mar. 2016

Research Fellowship for Young Scientists (DC2)

Japan Society of the Promotion of Science (JSPS)

Apr. 2015–Mar. 2016

Travel Grants.....

Grants for Researchers Attending International Conferences

The Tateishi Science and Technology Foundation

Oct. 2014.

Grants for Researchers Attending International Conferences

The Hara Research Foundation

Sept. 2014.

Grants for Researchers Attending International Conferences

The Telecommunications Advancement Foundation

Aug. 2013.

Publications

Journal Papers.....

- [1] 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.
- [2] Tomohiko Nakamura and Hirokazu Kameoka, "Harmonic-Temporal Factor Decomposition for Unsupervised Monaural Separation of Harmonic Sounds," *IEEE/ACM Transactions on Audio, Speech and Language Processing*, vol. 29, pp. 68–82, Nov. 2020.
- [3] Tomohiko Nakamura, Eita Nakamura, and Shigeki Sagayama, "Real-Time Audio-to-Score Alignment of Music Performances Containing Errors and Arbitrary Repeats and Skips," *IEEE/ACM Transactions on Audio, Speech and Language Processing*, vol. 24, issue 2, pp. 329–339, Feb. 2016.
- [4] Tomohiko Nakamura, Yutaka Hori and Shinji Hara, "Hierarchical Modeling and Local Stability Analysis for Repressilators Coupled by Quorum Sensing," *SICE Journal of Control, Measurement, and System Integration*, vol. 7, no. 3, pp. 133–140, May 2014. **[Best Paper Award (Takeda Award) from the Society of Instrument and Control Engineers]**
- [5] Eita Nakamura, Tomohiko Nakamura, Yasuyuki Saito, Nobutaka Ono, and Shigeki Sagayama, "Outer-Product Type Hidden Markov Model and Polyphonic MIDI Score Following," *Journal of New Music Research*, vol. 43, issue 2, pp. 183–201, Apr. 2014.

Peer-Reviewed International Conferences.....

- [1] Koichi Saito, Tomohiko Nakamura, Kohei Yatabe, Yuma Koizumi, and Hiroshi Saruwatari, "Sampling-Frequency-Independent Audio Source Separation Using Convolution Layer Based on Impulse Invariant Method," *Proc. 29th European Signal Processing Conference (EUSIPCO2021)*, Aug. 2021. (to appear)
- [2] Naoki Narisawa, Rintaro Ikeshita, Norihiro Takamune, Daichi Kiramura, Tomohiko Nakamura, Hiroshi

- Saruwatari, and Tomohiro Nakatani, "Independent Deeply Learned Tensor Analysis for Determined Audio Source Separation," *Proc. 29th European Signal Processing Conference (EUSIPCO2021)*, Aug. 2021. (to appear)
- [3] Takuya Hasumi, Tomohiko Nakamura, Norihiro Takamune, Hiroshi Saruwatari, Daichi Kitamura, Yu Takahashi, and Kazunobu Kondo, "Empirical Bayesian Independent Deeply Learned Matrix Analysis for Multichannel Audio Source Separation," *Proc. 29th European Signal Processing Conference (EUSIPCO2021)*, Aug. 2021. (to appear)
- [4] Shihori Kozuka, Tomohiko Nakamura, and Hiroshi Saruwatari, "Investigation on Wavelet Basis Function of DNN-based Time Domain Audio Source Separation Inspired by Multiresolution Analysis," *Proc. 49th International Congress and Exposition on Noise Control Engineering (INTERNOISE2020)*, Aug. 2020.
- [5] Tomohiko Nakamura and Hiroshi Saruwatari, "Time-domain Audio Source Separation based on Wave-U-Net Combined with Discrete Wavelet Transform," *Proc. 45th IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP2020)*, pp. 386–390, May 2020.
- [6] Tomohiko Nakamura and Hirokazu Kameoka, "Shifted and Convolutional Source-Filter Non-Negative Matrix Factorization for Monaural Audio Source Separation," *Proc. 41st IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP2016)*, pp. 489–493, Mar. 2016.
- [7] Tomohiko Nakamura and Hirokazu Kameoka, " L_p -Norm Non-Negative Matrix Factorization and Its Application to Singing Voice Enhancement," *Proc. 40th IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP2015)*, pp. 2115–2119, Apr. 2015.
- [8] Tomohiko Nakamura, Kotaro Shikata, Norihiro Takamune and Hirokazu Kameoka, "Harmonic-Temporal Factor Decomposition Incorporating Music Prior Information for Informed Monaural Source Separation," *Proc. 15th International Society for Music Information Retrieval Conference (ISMIR2014)*, pp. 623–628, Oct. 2014.
- [9] Takuya Higuchi, Hirofumi Takeda, Tomohiko Nakamura, Hirokazu Kameoka, "A Unified Approach for Underdetermined Blind Signal Separation and Source Activity Detection by Multichannel Factorial Hidden Markov Models," *Proc. 15th Annual Conference of the International Speech Communication Association (Interspeech2014)*, pp. 850–854, Sept. 2014.
- [10] Tomohiko Nakamura and Hirokazu Kameoka, "Fast Signal Reconstruction from Magnitude Spectrogram of Continuous Wavelet Transform based on Spectrogram Consistency," *Proc. 17th International Conference on Digital Audio Effects (DAFx-14)*, pp. 129–135, Sept. 2014.
- [11] Tomohiko Nakamura, Hirokazu Kameoka, Kazuyoshi Yoshii and Masataka Goto, "Timbre Replacement of Harmonic and Drum Components for Music Audio Signals," *Proc. 2014 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP2014)*, pp. 7520–7524, May, 2014.
- [12] Takuya Higuchi, Norihiro Takamune, Tomohiko Nakamura and Hirokazu Kameoka, "Underdetermined Blind Separation and Tracking of Moving Sources based on DOA-HMM," *Proc. 2014 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP2014)*, pp. 3215–3219, May, 2014.
- [13] Shigeki Sagayama, Tomohiko Nakamura, Eita Nakamura, Yasuyuki Saito, Hirokazu Kameoka and Nobutaka Ono, "Automatic Music Accompaniment Allowing Errors and Arbitrary Repeats and Jumps," *Proc. Meetings on Acoustics (POMA)*, vol. 21, 035003, 2014.
- [14] Tomohiko Nakamura, Eita Nakamura and Shigeki Sagayama, "Acoustic Score Following to Musical Performance with Errors and Arbitrary Repeats and Skips for Automatic Accompaniment," *Proc. Sound and Music Computing Conference (SMC2013)*, pp. 299–304, Aug. 2013.
- [15] Masahiro Nakano, Jonathan Le Roux, Hirokazu Kameoka, Tomohiko Nakamura, Nobutaka Ono and Shigeki Sagayama, "Bayesian Nonparametric Spectrogram Modeling Based on Infinite Factorial Infinite Hidden Markov Model," *Proc. 2011 IEEE Workshop on Applications of Signal Processing to Audio and Acoustics (WASPAA2011)*, pp. 325–328, Oct. 2011.
- [16] Tomohiko Nakamura, Shinji Hara and Yutaka Hori, "Local Stability Analysis for a class of Quorum-Sensing Networks with Cyclic Gene Regulatory Networks," *Proc. SICE Annual Conference*, pp. 2111–2116, Sept. 2011. **[SICE Annual Conference 2011 International Award, SICE Annual Conference**

2011 Finalist of Young Author Award]

Ph.D. Thesis.....

- [1] Tomohiko Nakamura, "Source-Filter Representation and Phase Estimation in Continuous Wavelet Transform Domain for Monaural Music Audio Editing," Ph.D. Thesis, The University of Tokyo, Mar. 2016. [**Dean's Award, IPSJ recommended Ph.D thesis**]

Patents.....

- [1] Tomohiko Nakamura, "Object recognition device, method, and program," Japan Unexamined Patent Application JP2021-033374, Mar. 1, 2021.
- [2] Tomohiko Nakamura, "Trained model and training device, method, and program," Japan Unexamined Patent Application JP2021-033395, Mar. 1, 2021.
- [3] Tomohiko Nakamura, "Object recognition device, method, and program," Japan Unexamined Patent Application JP2021-026685, Feb. 22, 2021.
- [4] Tomohiko Nakamura, Shohei Kunimatsu, Toshihiko Sakurai, and Ohnishi Ittoku, "Camera placement evaluation device, method, and program," Japan Unexamined Patent Application JP2021-10070, Jan. 28, 2021.
- [5] Tomohiko Nakamura, "Object recognition device, method, and program." Japan Patent JP6773829, Oct. 21, 2020.
- [6] Tomohiko Nakamura, "Training device, method, and program and object recognition device" Japan Patent JP6773825, Oct. 21, 2020.
- [7] Tomohiko Nakamura, "Database integration device, method, and program, and data imputation device," Japan Patent JP6768101, Oct. 14, 2020.
- [8] Tomohiko Nakamura, Tadahiko Ito and Masaki Shimaoka, "Certificate management device." Japan Patent JP6647259, Jan. 16, 2020.
- [9] Tomohiko Nakamura and Hirokazu Kameoka, "Vocal tract spectrum estimation device, method, and program," Japan Patent JP6420781, Oct. 19, 2018.

Awards

Awards of My Papers.....

- 1. 2021 Encouragement Award, Foundation of the Promotion of Engineering Research, Jul. 2021.
- 2. 2021 Otagaku Symposium Best Presentation Award, Jun. 2021.
- 3. IPSJ Recommended Ph.D. Thesis, Aug. 2016.
- 4. Dean's Award from Graduate School of Information Science and Technology, The University of Tokyo, Mar. 2016.
- 5. IPSJ Yamashita SIG Research Award, Mar. 2016.
- 6. SICE Best Paper Award (Takeda Award), Oct. 2015.
- 7. 2015 Otagaku Symposium Award, May 2015.
- 8. Best Student Presentation Award from ASJ, Mar. 2014.
- 9. IPSJ Certificate of Excellent Master's Thesis, Mar. 2013.
- 10. Student Encouragement Award of IPSJ National Convention, Mar. 2013.
- 11. SICE Annual Conference 2011 International Award, Sept. 2011.
- 12. SICE Annual Conference 2011 Finalist of Young Author Award, Sept. 2011.

Awards Received by My Students.....

- 1. 2021 Otagaku Symposium Best Student Presentation Award (Awardee: Koichi Saito), Jun. 2021.
- 2. Best Student Presentation Award from ASJ (Awardee: Takuya Hasumi) , May 2021.