Shin Matsushima

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Associate Professor (Principal Investigator)
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Experience

03/2020 – today **The University of Tokyo**, *Associate Professor (Principal Investigator)*, Tokyo, Japan.
Center for Education and Research in Information Science and Technology, Graduate School of Information Science and Technology
Data Science Research Division, Information Technology Center
Department of Creative Informatics, Graduate School of Information Science and Technology
Department of General Studies, Graduate School of Arts and Sciences
Interdisciplinary Initiative in Computing and Computational Sciences, Information Technology Center

04/2018 – 02/2020 **The University of Tokyo**, *Assistant Professor (Principal Investigator)*, Tokyo, Japan.
Department of General Studies, Graduate School of Arts and Sciences

10/2013 – 03/2018 **The University of Tokyo**, *Assistant Professor*, Tokyo, Japan.
Mathematical Informatics Laboratory 6
Department of Mathematical Informatics, Graduate School of Information Science and Technology

04/2013 – 09/2013 **The University of Tokyo**, *Research Fellow*, Tokyo, Japan.
Mathematical Informatics Laboratory 6
Department of Mathematical Informatics, Graduate School of Information Science and Technology

09/2011 – 05/2012 **Purdue University**, *Visiting Scholar*, Indiana, U.S.A.
Department of Statistics
Supervisor Prof. Dr. S. V. N. Vishwanathan

04/2011 - 03/2013 **The University of Tokyo**, *Research Fellow*, Tokyo, Japan.
Mathematical Language Informatics Laboratory
Department of Mathematical Informatics, Graduate School of Information Science and Technology

Education

04/2010 – 03/2013 **Ph.D. (Information Science and Technology)**.
Department of Mathematical Informatics, Graduate School of Information Science and Technology, The University of Tokyo
Thesis A Study on Efficient Algorithms for Machine Learning from Large-scale Data

Supervisor Prof. Dr. H. Nakagawa

04/2008 – 03/2010 **Master of Information Science and Technology**.
Department of Mathematical Informatics, Graduate School of Information Science and Technology, The University of Tokyo

Thesis A Study on Exact Solutions of Aggressive Updates for Multi-class Classifications

Supervisor Prof. Dr. T. Ninomiya

04/2006 – 03/2008 **B.E., Materials Engineering**.
Faculty of Engineering, The University of Tokyo

Teaching

04/2018 – today Information Mathematics VII (Machine Learning)
Introduction to Algorithms
Information
Practical Study of Machine Learning

10/2013 – 03/2018 Exercises in Mathematical Information Engineering 1C
Laboratory on Mathematical Engineering and Information Physics

Grants

04/2019 – 03/2021 **Grant-in-Aid for Young Scientists from Japan Society for the Promotion of Science (JSPS)**.

Project Convex Optimization Schemes and Theoretical Guarantees for Large-scale Subspace Clustering

04/2018 – 03/2019 **National Institute of Infomatics Collaborative Research**.

Project Large-scale Learning of Combinatorial Binary Models using Frequent Itemset Mining

04/2016 – 03/2017 **Microsoft Research Lab Asia Collaborative Research (CORE 12)**.

Project Machine Learning from Big Data using Scalable Feature Selection

04/2014 – 03/2018 **Grant-in-Aid for Young Scientists (B) from Japan Society for the Promotion of Science (JSPS)**.

Project Foundation od Optimization Algorithm and Architecture Suitable for Machine Learning using Big Data

04/2013 – 03/2017 **Research Fellowship for Young Scientists (PD) from Japan Society for the Promotion of Science (JSPS)**.

Project Asynchronous Distributed Optimization Methods for Big Data Analysis

04/2011 – 03/2013 **Research Fellowship for Young Scientists (DC2) from Japan Society for the Promotion of Science (JSPS)**.

Project A Study on Online Algorithms in Data Streaming Environments

Journal Publications

6 T. Lee, S. Matsushima, K. Yamanishi.
"Grafting for Combinatorial Boolean Model using Frequent Itemset Mining," *Data Mining and Knowledge Discovery* 2020, 34(1), pp.101–123.

5 Y. Fu, S. Matsushima, K. Yamanishi.
"Model Selection for Non-negative Tensor Factorization with Minimum Description Length." *Entropy* 2019, 21(7), 632.

4 K. Moriya, S. Matsushima, K. Yamanishi.
"Traffic Risk Mining From Heterogeneous Road Statistics," *IEEE Transactions on Intelligent Transportation Systems*, Vol. 19, Issue 11, pp. 3662–3675, 2018.

3 H. Oiwa, S. Matsushima, H. Nakagawa.
"Feature-aware Regularization for Sparse Online Learning," *Science China Information Sciences*, Vol. 57, Issue 5, pp. 1–21, 2014.

2 S. Matsushima, N. Shimizu, K. Yoshida, T. Ninomiya, H. Nakagawa.
"An Efficient and Exact Solution of Passive-Aggressive Algorithm for Multiclass Classification Problems," *The IEICE Transactions on Information and Systems (Japanese edition)*, J93-D(6), pp. 724–732 (in Japanese), 2010.

1 S. Matsushima, I. Sato, T. Ninomiya, H. Nakagawa.
"An Empirical Study of PA Algorithm Using Unlabeled Data," *DBSJ Journal*, Vol. 9, No. 1, pp. 82–87 (in Japanese), 2010.

Refereed Conference Papers

15 S. Hayashi, M. Sugiyama, S. Matsushima.
"Coordinate Descent Method for Log-linear Model on Posets," *IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, 2020, pp. 99–108.

14 S. Matsushima, M. Brbić.
"Large-scale Sparse Subspace Clustering by Selective Sampling." *Thirty-third Conference on Neural Information Processing Systems (NeurIPS)*, 2019, pp.12416–12425.

13 P. Raman, S. Srinivasan, S. Matsushima, X. Zhang, H. Yun, S. V. N. Vishwanathan.
"Scaling Multinomial Logistic Regression via Hybrid Parallelism," *ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)*, 2019, pp. 1460–1470.

12 T. Kobayashi, S. Matsushima, T. Lee, K. Yamanishi.
"Discovering Potential Traffic risks in Japan using a Supervised Learning Approach," *IEEE International Conference on Big Data (Big Data)*, 2017, pp. 948–955.

11 K. Miyaguchi, S. Matsushima, K. Yamanishi.
"Sparse Graphical Modeling via Stochastic Complexity," *SIAM International Conference on Data Mining, (SDM)*, 2017. pp. 723–731.

10 S. Matsushima, H. Yun, X. Zhang, S. V. N. Vishwanathan.
"Distributed Stochastic Optimization of Regularized Risk via Saddle-Point Problem," *Joint European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD)*, 2017, pp. 460–476.

9 S. Ji, H. Yun, P. Yanardag, S. Matsushima, S. V. N. Vishwanathan.
"WordRank: Learning Word Embeddings via Robust Ranking," *Conference on Empirical Methods in Natural Language Processing (EMNLP)*, 2016, pp. 658–668.

8 T. Lee, S. Matsushima, K. Yamanishi.
"Traffic Risk Mining Using Partially Ordered Non-Negative Matrix Factorization," *IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, 2016, pp. 622–631.

7 A. Demachi, S. Matsushima, K. Yamanishi.
"Web Behavior Analysis Using Sparse Non-Negative Matrix Factorization," *IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, 2016, pp. 574–583.

6 S. Matsushima.
" Asynchronous Feature Extraction for Large-Scale Linear Predictors," *Joint European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD)*, 2016, pp. 604–618.

5 K. Moriya, S. Matsushima, K. Yamanishi.
"Traffic Risk Mining from Heterogeneous Road Statistics," *IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, 2015, pp. 1–10.

4 H. Oiwa, S. Matsushima, H. Nakagawa.
"Healing Truncation Bias: Self-Weighted Truncation Framework for Dual Averaging," *12th IEEE International Conference on Data Mining (ICDM)*, 2012, pp. 575–584.

3 S. Matsushima, S. V. N. Vishwanathan, A. J. Smola.
"Linear Support Vector Machines via Dual Cached Loops," *ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)*, 2012, pp. 177–185.

2 H. Oiwa, S. Matsushima, H. Nakagawa.
"Frequency-aware Truncated Methods for Sparse Online Learning," *Joint European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD)*, 2012, pp. 533–548.

1 S. Matsushima, N. Shimizu, K. Yoshida, T. Ninomiya, H. Nakagawa.
"Exact Passive-Aggressive Algorithm for Multiclass Classification Using Support Class," *SIAM International Conference on Data Mining (SDM)*, 2010, pp. 303-314.