

Project Researcher  
Cognitive Developmental Robotics Lab,  
International Research Center for Neurointelligence  
University of Tokyo, Japan

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## RESEARCH INTERESTS

**Machine Learning, Reinforcement Learning**, theory and application of machine learning for real-world complex problems such as large-scale automation, healthcare, brain cognition, etc.

## ACADEMIC POSITIONS

### Project Researcher

IRCN-CDR Lab, University of Tokyo, Japan

supervisor: Yukie Nagai

2024-present

### Postdoc Fellow

RLAI Lab, University of Alberta, Canada

supervisor: Martha White

2022-2024

## EDUCATION

### Ph.D. with the Best Student Honor

Robot Learning Lab, Nara Institute of Science and Technology, Japan

supervisor: Takamitsu Matsubara

2019-2022

Thesis title: Entropy regularization for scalable, safe and robust reinforcement learning

### Master of Engineering

Robot Learning Lab, Nara Institute of Science and Technology, Japan

supervisor: Takamitsu Matsubara

2017-2019

Thesis title: RL for Large-scale Process Control: application to vinyl acetate monomer process

### Bachelor of Engineering

Tianjin Polytechnic University, China

2013-2017

## PUBLICATIONS

### Refereed Journal and Conference Articles

(† indicates joint first authors)

- [1] **Towards Physiologically Sensible Predictions via the Rule-based Reinforcement Learning Layer**,  
Lingwei Zhu, Z. Chen, Y. Nagai, J. Sun,  
Preprint, 2025.
- [2] **Fat-to-Thin Policy Optimization: Offline RL with Sparse Policies**,  
Lingwei Zhu, H. Wang, Y. Nagai,  
International Conference on Learning Representations (ICLR), 2025.
- [3]  **$q$ -Exponential Family for Policy Optimization**,  
Lingwei Zhu, H. Shah, H. Wang, Y. Nagai, M. White,  
International Conference on Learning Representations (ICLR), 2025.
- [4] **Offline Reinforcement Learning with Tsallis Regularization**,  
Lingwei Zhu, M. Schlegel, H. Wang, M. White,  
Transaction on Machine Learning Research (TMLR), 2024.
- [5] **Generalized Munchausen Reinforcement Learning using Tsallis KL Divergence**,  
Lingwei Zhu, Z. Chen, M. Schlegel, M. White,  
Advances on Neural Information Processing Systems (NeurIPS), 2023.
- [6] **Cautious Policy Programming: Exploiting KL for Monotonic Policy Improvement in RL**,  
Lingwei Zhu, T. Matsubara, Machine Learning, 2023.
- [7] **Cyclic policy distillation: Sample-efficient sim-to-real RL with domain randomization**,  
Y. Kadokawa, Lingwei Zhu, Y. Tsurumine, T. Matsubara, Robotics and Autonomous Systems, 2023.

- [8] **Automated Sleep Staging via Parallel Frequency-Cut Attention**, Z. Chen, Z. Yang, Lingwei Zhu, W. Chen, T. Tamura, N. Ono, MD Altaf-Ul-Amin, S. Kanaya, IEEE Transactions on Neural Systems and Rehabilitation Engineering, 2023.
- [9] **Learning vector quantized representation for cancer subtypes identification**, Z. Chen<sup>†</sup>, Z. Yang<sup>†</sup>, Lingwei Zhu<sup>†</sup>, P. Gao, T. Matsubara, S. Kanaya, Md Altaf-Ul-Amin, Computer Methods and Programs in Biomedicine, 2023.
- [10] **Alleviating parameter-tuning burden in RL for large-scale process control**, Lingwei Zhu, G. Takami, M. Kawahara, H. Kanokogi, T. Matsubara, Computers and Chemical Engineering, 2022.
- [11] **A Two-View EEG Representation for Brain Cognition by Composite Temporal-Spatial Contrastive Learning**, Z. Chen<sup>†</sup>, Lingwei Zhu<sup>†</sup>, H. Jia, T. Matsubara, SIAM International Conference on Data Mining, 2023.
- [12] **Hierarchical Categorical Generative Modeling for Multi-omics Cancer Subtyping**, ZW. Yang<sup>†</sup>, Lingwei Zhu<sup>†</sup>, C. Li, Z. Chen, N. Ono, M. Altaf-Ul-Amin, S. Kanaya, International Conference on Bioinformatics and Biomedicine (BIBM), 2022.
- [13] **Automated cancer subtyping via vector quantization mutual information maximization**, Z. Chen<sup>†</sup>, Lingwei Zhu<sup>†</sup>, Z. Yang, T. Matsubara, European Conference on Machine Learning (ECML), 2022.
- [14] **Multi-tier platform for cognizing massive electroencephalogram**, Z. Chen<sup>†</sup>, Lingwei Zhu<sup>†</sup>, Z. Yang, R. Zhang, International Joint Conference on Artificial Intelligence (IJCAI), 2022.
- [15] **Cancer Subtyping via Embedded Unsupervised Learning on Transcriptomics Data**, Z. Yang, Lingwei Zhu, Z. Chen, M. Huang, N. Ono, MD. Altaf-Ul-Amin, S. Kanaya, IEEE Engineering in Medicine & Biology Society (EMBC), 2022.
- [16] **Adaptive Spike-Like Representation of EEG Signals for Sleep Stages Scoring**, Lingwei Zhu, Z. Yang, K. Odani, G. Shi, Y. Kan, Z. Chen, R. Zhang, IEEE Engineering in Medicine & Biology Society (EMBC), 2022.
- [17] **Cautious Actor-Critic**, Lingwei Zhu, T. Kitamura, T. Matsubara, Asian Conference on Machine Learning (ACML), 2021.
- [18] **Geometric Value Iteration: Dynamic Error-Aware KL Regularization for Reinforcement Learning**, T. Kitamura, Lingwei Zhu, T. Matsubara, Asian Conference on Machine Learning (ACML), 2021.
- [19] **Scalable reinforcement learning for plant-wide control of vinyl acetate monomer process**, Lingwei Zhu, G. Takami, H. Kanokogi, T. Matsubara, Control Engineering Practice, 2020.
- [20] **Dynamic actor-advisor programming for scalable safe reinforcement learning**, Lingwei Zhu, Y. Cui, T. Matsubara, IEEE International Conference on Robotics and Automation, 2020.
- [21] **Factorial Kernel Dynamic Policy Programming for Vinyl Acetate Monomer Plant Model Control**, Y. Cui<sup>†</sup>, Lingwei Zhu<sup>†</sup>, M. Fujisaki, H. Kanokogi, T. Matsubara, IEEE International Conference on Automation Science and Engineering (CASE), 2018.

## International Patents

*Inventor of apparatus, method, program and recording medium*

- **United States patent Patent Number US20200057416A1**, T. Matsubara, Y. Cui, Lingwei Zhu, et al.,
- **European patent; Patent Number EP3620868A1**, T. Matsubara, Y. Cui, Lingwei Zhu, et al.,
- **Chinese patent; Patent Number CN110837893A**, T. Matsubara, Y. Cui, Lingwei Zhu, et al.,
- **Japanese patent; Patent Number JP2020027556A**, T. Matsubara, Y. Cui, Lingwei Zhu, et al.,

## AWARDS AND HONORS

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**Prime Minister's Prize of Japan Industrial Technology Awards,** 2023

**Best Ph.D. student honor,** Nara Institute of Science and Technology, 2022

### **National Scholarships:**

• Japanese Society for Promotion of Science - DC2, (83/416,  $\sim 19.8\%$ ), 2021-2022

• Japanese Government Scholarship (MEXT), 2020-2021

**IEEE Kansai Chapter Paper Award,** 2020

Awarded to *Dynamic actor-advisor programming for scalable safe reinforcement learning*

## ACADEMIC SERVICES

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**Program Committee Member (Reviewer)** 2021-present

JMLR, IEEE-TNNLS, TMLR, NeurIPS, ICLR, ICML

AAAI, AISTATS, IJCAI, RAL, ICRA, IROS

## PERSONAL INFORMATION

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**Languages:** fluent English, semi-fluent Japanese, native Chinese

**Citizenship:** Chinese