Naoki Chihara

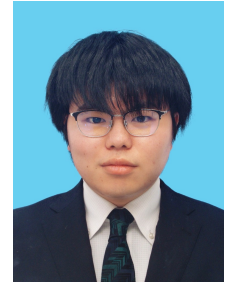|	
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About me

I am Naoki Chihara, a second-year M.Sc. student at Osaka University, Japan, and a specially appointed researcher at SANKEN (The Institute of Scientific and Industrial Research at Osaka University). My research mainly focuses on data stream mining [C1, C2] and causal discovery in time series [C1]. I am fortunate to be advised by Prof. Yasushi Sakurai and Prof. Yasuko Matsubara at SANKEN. I received my B.Sc. and M.Sc. degrees from Osaka University advised by Prof. Makoto Onizuka and Prof. Yasushi Sakurai in March 2023 and 2025, respectively.

Keywords: <u>Time series analysis</u>, Data mining, <u>Stream processing</u>, <u>Causality</u>, Koopman operator theory, Missingness mechanisms, Time series forecasting, <u>Bayesian optimization</u>

Links: in Linkedin | 🎓 Google Scholar | ⬡ GitHub | Ⓓ ORCID | 🐦 Twitter | 🦋 DBLP

Education

Ph.D. in Information Science, Osaka University — 2025–present
Department of Information Systems Engineering, Graduate School of Information Science and Technology — Osaka, Japan
- Exptected graduation date is March 2028
- Supervisor: Prof. Yasushi Sakurai

M.Sc. in Information Science, Osaka University — 2023–2025
Department of Information Systems Engineering, Graduate School of Information Science and Technology — Osaka, Japan
- Thesis: Stream Mining Time-evolving Causality for Time Series Forecasting
- Supervisor: Prof. Yasushi Sakurai

B.Sc. in Engineering, Osaka University — 2019–2023
Department of Electronic and Information Engineering, School of Engineering — Osaka, Japan
- Thesis: Detection of Variable Celestial Objects using Machine Learning-based Periodic Analysis and Domain Knowledge
- Supervisor: Prof. Makoto Onizuka

Experience

Japan Society for the Promotion of Science (JSPS) — 2025–present
Research Fellow DC1 — Osaka, Japan

SANKEN, Osaka University — 2023–present
Specially Appointed Researcher — Osaka, Japan

School of Engineering, Osaka University — 2023
Teaching Assistant for "Exercises in Mathematical Analysis" — Osaka, Japan

Graduate School of Information Science and Technology, Osaka University — 2021–2023
Assistant in the detection of variable celestial objects — Osaka, Japan

Nagase Co., Ltd. — 2020–2023
Digital Technology Engineer — Tokyo, Japan

Grants and Awards

Award of the Graduate School of Information Science and Technology of Osaka University — Mar 2025

DEIM2025 Student Presentation Award	Mar 2025
Information Processing Society of Japan (IPSJ) Yamashita SIG Research Award	Jul 2024
DEIM2024 Best Paper Award Runner-up (top 1.4%)	Jun 2024
Osaka University Humanware Innovation Program Scholarship	2023-present

Publications

Peer-reviewed Publications

[C2] <u>Naoki Chihara</u>, Ren Fujiwara, Yasuko Matsubara, and Yasushi Sakurai. **Nova: Learning Nonlinear Time-varying Dynamical Systems from Data Streams with Koopman Operator**. (Under submission to SIGKDD).

[C1] <u>Naoki Chihara</u>, Yasuko Matsubara, Ren Fujiwara, and Yasushi Sakurai. **Modeling Time-evolving Causality over Data Streams**. Proceedings of the 31st ACM SIGKDD Conference on Knowledge Discovery and Data Mining (**KDD '25**), Toronto, ON, Canada, August 3-7, 2025. Acceptance rate: 19%. 📖 DOI: [10.1145/3690624.3709283](10.1145/3690624.3709283). 🔗 C-Naoki/ModePlait | ▶ [01hS6R1a8jg](01hS6R1a8jg)

[W1] <u>Naoki Chihara</u>, Yasuko Matsubara, Ren Fujiwara, and Yasushi Sakurai. **Stream Mining Time-evolving Causality in Time Series**. The 30th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD '24) PhD Consortium, Barcelona, Spain, August 25-29, 2024. 🔗 URL: kdd2024.kdd.org/ph-d-consortium.

[J2] <u>Naoki Chihara</u>, Yasuko Matsubara, Ren Fujiwara, and Yasushi Sakurai. **Real-time Forecasting of Time-evolving Data Streams using Dynamic Mode Decomposition**. IPSJ Transactions on Databases (TOD), Vol. 17, No. 2, pp. 1-11, April 23, 2024. 🔗 URL: ipsj.ixsq.nii.ac.jp/records/233825.

[J1] <u>Naoki Chihara</u>, Tadafumi Takata, Yasuhiro Fujiwara, Koki Noda, Keisuke Toyoda, Kaito Higuchi, and Makoto Onizuka. **Effective detection of variable celestial objects using machine learning-based periodic analysis**. Astronomy and Computing, Vol. 45, pp. 100765, November 3, 2023. 📖 DOI: 10.1016/j.ascom.2023.100765.

Non-refereed Publications

[N4] <u>Naoki Chihara</u>, Yasuko Matsubara, Ren Fujiwara, and Yasushi Sakurai. **時間変化する因果関係の抽出に基づいた高速将来予測**. The 17th Forum on Data Engineering and Information Management (DEIM2025), Fukuoka, Japan, February 27 - March 4, 2025.
Student Presentation Award.

[N3] <u>Naoki Chihara</u>, Yasuko Matsubara, Ren Fujiwara, and Yasushi Sakurai. **動的モード分解を活用した高速将来予測アルゴリズム**. The 16th Forum on Data Engineering and Information Management (DEIM2024), Hyogo, Japan, February 28 - March 5, 2024.
Best Paper Award Runner-up, IPSJ Yamashita SIG Research Award.

[N2] Aiyi Li, Kenya Hoshimure, Kei Tanigaki, Yota Hatano, Reina Nozawa, Yuki Sakamoto, Yuanzhou Wei, <u>Naoki Chihara</u>, and Naoki Kodani. **Semi-autonomous Leader-follower Approach for Swarm Drone Guidance**. The 36th SICE Symposium on Decentralized Autonomous Systems, Tokyo, Japan, February 16-17, 2024.

[N1] <u>Naoki Chihara</u>, Tadafumi Takata, Yasuhiro Fujiwara, and Makoto Onizuka. **周期解析による変動天体の検出**. The 15th Forum on Data Engineering and Information Management (DEIM2023), Gifu, Japan, March 5-9, 2023.

Patents

[P1] Yasuhiro Fujiwara, Makoto Onizuka, and <u>Naoki Chihara</u>. **検出装置、検出方法及びプログラム**. 特開 2025-000129, January 7, 2025. 🔗 URL: jglobal.jst.go.jp/detail?JGLOBAL_ID=202503009056531197.

Academic Services

External Reviewers

- ACM WWW   2025
- ACM SIGKDD   2025

Conference Volunteer Work

- PAKDD   2023