

Zhenjiang Zhao

ASSISTANT PROFESSOR

Computer Science Program, The University of Electro-Communications, Tokyo, Japan

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🔍 Google Scholar | 📄 DBLP | 📁 researchmap

Research Interest

As AI rapidly advances and becomes widely used, my research is driven by a central question:

How can we assess whether AI systems are trustworthy, and how can we make them more trustworthy?

On one hand, I study how techniques from Software Engineering (SE), such as testing, verification, and formal methods, can be used to evaluate and improve the reliability, fairness, and safety of AI systems. This is part of my main research direction, Software Engineering for AI (SE4AI). On the other hand, as AI is increasingly used for code generation and software development, I am also interested in AI for Software Engineering (AI4SE), especially quality assurance and reliability issues in AI-assisted programming.

Appointments

Assistant Professor	Computer Science Program, The University of Electro-Communications. Research and development on verification testing of machine learning systems and	2026 - pres.
Research Assistant	cyber-physical systems, the National Institute of Advanced Industrial Science and Technology.	2022 - 2026

Education

Ph.D.	The University of Electro-Communications, Tokyo, Japan.	2023 - 2026
M.Eng.	The University of Electro-Communications, Tokyo, Japan.	2021 - 2023
B.Math.	The School of Mathematical and Computational Science, Xiangtan University, Xiangtan, China.	2014 - 2018

Publications

Journal Articles

- [J1] **Zhenjiang Zhao**, Takahisa Toda, and Takashi Kitamura. Diversity-aware fairness testing of machine learning classifiers through hashing-based sampling. Information and Software Technology, vol. 167. 2024. (a top-tier journal in SE with IF: 4.3, 📄 Paper Link, 📁 Code Link)

Conference Papers

- [C3] **Zhenjiang Zhao**, Takahisa Toda, and Takashi Kitamura. Approximation-guided Fairness Testing through Discriminatory Space Analysis. In Proceedings of the 39th IEEE/ACM International Conference on Automated Software Engineering (ASE), pp. 1007–1018. 2024. (CORE A*, 📄 Paper Link, 📁 Code Link)
- [C2] **Zhenjiang Zhao**, Takahisa Toda, and Takashi Kitamura. Efficient Fairness Testing Through Hash-Based Sampling. In Proceedings of Search-Based Software Engineering (SSBSE), pp. 35–50. 2022. (CORE B, 📄 Paper Link)
- [C1] Takashi Kitamura, **Zhenjiang Zhao**, and Takahisa Toda. Applying Combinatorial Testing to Verification-Based Fairness Testing. In Proceedings of Search-Based Software Engineering (SSBSE), pp. 101–107. 2022. (CORE B, 📄 Paper Link)

Preprints & Under Review

- [P1] **Zhenjiang Zhao**, Takahisa Toda, and Takashi Kitamura. Quantitative Verification of Fairness in Tree Ensembles. arXiv preprint arXiv:2512.16386. 2025. (📄 Paper Link)

Non-Peer Reviewed

- [N4] Saki Ishii, **Zhenjiang Zhao**, and Takahisa Toda. Improving the Approximation Performance of Surrogate Models in Black-Box Fairness Testing of Machine Learning. In Proceedings of SIG on Fundamental Problems of Artificial Intelligence (SIG-FPAI), vol. 135, pp. 73–78. 2026. ([Paper Link](#))
- [N3] Kento Ohashi, **Zhenjiang Zhao**, and Takahisa Toda. Developing a General-Purpose Testing Tool for Machine Learning Robustness. In Proceedings of SIG on Fundamental Problems of Artificial Intelligence (SIG-FPAI), vol. 135, pp. 79–84. 2026. ([Paper Link](#))
- [N2] **Zhenjiang Zhao**, Takahisa Toda, and Takashi Kitamura. Toward Individual Fairness Testing for XGBoost Classifier through Formal Verification. In Proceedings of the Annual Conference of Japanese Society for Artificial Intelligence (JSAI). 2024. ([Paper Link](#))
- [N1] **Zhenjiang Zhao**, and Takahisa Toda. Note on CDCL Inference with Similar Learnt Clauses. In Proceedings of the Annual Conference of Japanese Society for Artificial Intelligence (JSAI). 2022. (In Japanese, [Paper Link](#))

Honors & Awards

- 2026 **Distinguished Reviewer**, ICSE 2026, Shadow Research Track — selected 23/182 reviewers (top 13%)
- 2022 **SAT Competition**, 3rd place on the CaDiCaL Hacks Track

Grants & Funding

- 2023 - 2026 **The Next Generation Researcher Challenge Research Program of the University of Electro-Communications**, the Japan Science and Technology Agency (JST). 183,750 yen / month

Professional Service

Program Committees

- Program Committee** International Conference on Software Engineering (ICSE), Research Track 2027. 2026
- Program Committee** International Conference on Software Engineering (ICSE), Shadow Research Track 2026. 2025

Journal Reviewing

- Reviewer** Review activity for journal, IEEE Transactions on Software Engineering (TSE). 2026
- Reviewer** Review activity for journal, Knowledge-Based Systems. 2026 - pres.
- Reviewer** Review activity for journal, Expert Systems with Applications (IF: 7.5). 2024 - pres.
- Reviewer** Review activity for journal, Information and Software Technology (IF: 4.3). 2024

Scholarships & Travel Support

- 2024 **Travel Expense Support for Students Presenting at International Conferences through the Graduate School Dean's Discretionary Fund**, the University of Electro-Communications. 90,000 yen
- 2024 **Support for Student English Presentations: Conference Participation Fee Assistance through the Meguro-kai and the University of Electro-Communications Fund Grant Program**, the University of Electro-Communications. 50,000 yen
- 2022 **Scholarship for international student**, the Japan Educational Exchanges and Services. 100,000 yen
- 2021 **MEXT Honors Scholarship**, the Japan Student Services Organization. 48,000 yen

Invited Presentations

** presenting author*

- [I4] **Zhenjiang Zhao***. Presentation at IPSJ/SIGSE Software Engineering Symposium (SES2025), Invited to present the paper “Approximation guided Fairness Testing through Discriminatory Space Analysis” published in ASE. In IPSJ/SIGSE Software Engineering Symposium (SES), Sep 2025.
- [I3] **Zhenjiang Zhao***. Presentation in the Top Conference Section at Forum on Information Technology, Invited to present the paper “Approximation guided Fairness Testing through Discriminatory Space Analysis” published in ASE. In Forum on Information Technology (FIT), Sep 2025.
- [I2] **Zhenjiang Zhao***. Presentation at IPSJ/SIGSE Software Engineering Symposium (SES2024), Invited to present the paper “Diversity-aware Fairness Testing of Machine Learning Classifiers through Hashing-based Sampling” published in IST. In IPSJ/SIGSE Software Engineering Symposium (SES), Sep 2024.
- [I1] **Zhenjiang Zhao***. Presentation in the Top Conference Section at Forum on Information Technology, Invited to present the paper “Diversity-aware Fairness Testing of Machine Learning Classifiers through Hashing-based Sampling” published in IST. In Forum on Information Technology (FIT), Sep 2024.

Oral & Poster Presentations

** presenting author*

- [O12] **Zhenjiang Zhao***. Trends and Issues in Fairness Testing and Verification. In Implementation Science Workshop (ISW), Feb 2026.
- [O11] **Zhenjiang Zhao***, Takahisa Toda, and Takashi Kitamura. Consideration of Quantitative Verification Methods of Fairness Specialized for Decision Tree Ensembles. In Workshop of Information-Based Induction Sciences (IBIS), Nov 2025.
- [O10] **Zhenjiang Zhao***, Takahisa Toda, and Takashi Kitamura. Considerations on the Quantitative Verification of Fairness in Machine Learning Models. In Special Interest Group on Machine Learning Systems Engineering (MLSE), Jul 2025.
- [O9] **Zhenjiang Zhao***, Takahisa Toda, and Takashi Kitamura. Considerations on the Approximate Performance of Verification-Based Fairness Testing Techniques. In Workshop of Fundamentals of Software Engineering (FOSE), Nov 2024.
- [O8] **Zhenjiang Zhao***, Takahisa Toda, and Takashi Kitamura. Consideration of a Verification-Based Fairness Testing Technique Without Constraint Solving. In Workshop of Information-Based Induction Sciences (IBIS), Nov 2024.
- [O7] **Zhenjiang Zhao***. Trends in Techniques for Individual Fairness Testing of Machine Learning Models. In Workshop on Algorithmic Fairness and Software Engineering at IPSJ/SIGSE Software Engineering Symposium (SES), Sep 2024.
- [O6] **Zhenjiang Zhao***, Takahisa Toda, and Takashi Kitamura. Consideration of Fairness Testing Method Based on a Complete Search for Paths in Decision Tree. In Special Interest Group on Machine Learning Systems Engineering (MLSE), Jun 2023.
- [O5] **Zhenjiang Zhao***, Takahisa Toda, and Takashi Kitamura. A Diversity-Aware Fairness Testing Technique and Considerations of Its Diversity. In Workshop of Fundamentals of Software Engineering (FOSE), May 2023.
- [O4] **Zhenjiang Zhao***, Takahisa Toda, and Takashi Kitamura. Fairness Testing of Machine Learning Model. In Programming Symposium, Information Processing Society of Japan, Jan 2023.
- [O3] **Zhenjiang Zhao***. Paper Introduction: Efficient Fairness Testing Through Hash-Based Sampling (SSBSE2022). In IPSJ/SIGSE Winter Workshop, Jan 2023.
- [O2] **Zhenjiang Zhao***, Takahisa Toda, and Takashi Kitamura. Fairness Testing Method ‘VBT-X’ and Its Future Challenges. In Workshop of Information-Based Induction Sciences (IBIS), Nov 2022.
- [O1] **Zhenjiang Zhao***, Takahisa Toda, and Takashi Kitamura. VBT-X: A Fairness Testing Method of Machine Learning Model. In Workshop of Fundamentals of Software Engineering (FOSE), Nov 2022.

Teaching Experience

Fall 2025 **Complex Analysis**, Teaching Assistant.
Fall 2024 **Complex Analysis**, Teaching Assistant.
Fall 2023 **Complex Analysis**, Teaching Assistant.
Fall 2022 **Computer Literacy**, Teaching Assistant.
Fall 2022 **Complex Analysis**, Teaching Assistant.
Spring 2022 **Fundamental Programming**, Teaching Assistant.

Competition Experience

2021 **Yamato Transport 5 Days data competition**, Victory.
2021 **Yamato Transport Hackathon: the SDGs Challenge**, Victory.
2017 **Contemporary Undergraduate Mathematical Contest in Modeling**, Second Prize.
2016 **Contemporary Undergraduate Mathematical Contest in Modeling**, Second Prize.

Internships

Research Intern	Research on modeling the function of air traffic control, the Electronic Navigation Research Institute.	<i>Sept. 2021</i>
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