Keita Nakamura

Department of Information Sciences, Graduate School of Science and Technology,
Tokyo University of Science
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1. Education

Tokyo University of Science (Chiba, Japan) *Apr 2024 – Present*
Doctoral Program in Information Sciences, Graduate School of Science and Technology.

Yokohama City University (Yokohama, Japan) *Jun 2023 – Mar 2024*
Research Student in Medical Science, Graduate School of Medicine.

Tokyo University of Science (Chiba, Japan) *Apr 2021 – Mar 2023*
Master of Science in Information Sciences, Graduate School of Science and Technology.

Tokyo University of Science (Chiba, Japan) *Apr 2017 – Mar 2021*
Bachelor of Science in Information Sciences, Faculty of Science and Technology.

Tokyo Metropolitan Kunitachi Senior High School (Tokyo, Japan) *Graduated Mar 2017*

2. Teaching Experience

Teaching Assistant, Tokyo University of Science *Apr 2025 – Present*
Probability Theory 1 and its Exercises, Mathematics for Information Sciences 2B and its Exercises

Teaching Assistant, Tokyo University of Science *Oct 2024 – Mar 2025*
Statistics 1 and its Exercises, Mathematics for Information Sciences 2A and its Exercises

Teaching Assistant, Tokyo University of Science *Apr 2024 – Sep 2024*
Probability Theory 1 and its Exercises, Mathematics for Information Sciences 2B and its Exercises

Learning Support Center, Tokyo University of Science *Apr 2022 – Mar 2023*
Academic support and tutoring for undergraduate students in mathematics.

3. Research

Tokyo University of Science (Chiba, Japan) *Apr 2024 – Present*
Doctoral Research, under Prof. Kouji Tahata
Graduate School of Science and Technology, Department of Information Sciences

Current Research (2024–Present):

- **Quasi-symmetry and Geometric Marginal Homogeneity:** Development of a simplicial approach to square contingency tables using Aitchison geometry. This research introduces the novel concept of geometric marginal homogeneity as an alternative perspective on table structures that is less restrictive than symmetry.

Yokohama City University (Yokohama, Japan) *Jun 2023 – Mar 2024*
Research Student, Graduate School of Medicine

Research focus: Explored potential applications of symmetry analysis methods for contingency tables to healthcare data analysis.

Tokyo University of Science (Chiba, Japan) *Apr 2021 – Mar 2023*
Master's Thesis Research, under Prof. Kouji Tahata
Graduate School of Science and Technology, Department of Information Sciences

Master's Research (2021–2023):

- **Symmetry of Square Contingency Tables Using Simplicial Geometry:** Development of methods for analyzing symmetry structures in square contingency tables through the application of simplicial geometry.

Research Methodology:

- Compositional data analysis and Aitchison geometry on the simplex
- Simplicial geometry approaches to statistical analysis
- Centered log-ratio (clr) transformations and orthogonal decomposition methods
- Statistical modeling for categorical data and contingency table analysis
- R programming for statistical computation and geometric visualization

4. Awards and Honors

Best Presentation Award, Japanese Society of Applied Statistics *May 2024*
Awarded for the presentation "Symmetry and skew-symmetry of square contingency tables based on Aitchison geometry" at the Japanese Society of Applied Statistics Annual Conference, Kyushu University.

5. Publications and Presentations

5.1 Publications

K. Nakamura, T. Nakagawa, K. Tahata: "Quasi-Symmetry and Geometric Marginal Homogeneity: A Simplicial Approach to Square Contingency Tables", *Information Geometry*, 2025. DOI: 10.1007/s41884-025-00176-1

K. Nakamura, T. Nakagawa, K. Tahata: "Symmetry of Square Contingency Tables Using Simplicial Geometry", *Austrian Journal of Statistics*, Vol. 53, No. 4, pp. 85-98, 2024. DOI: 10.17713/ajs.v53i4.1845

5.2 Conference Presentations

5.2.1 International Conferences

[1] K. Nakamura, T. Nakagawa, K. Tahata: "Geometric Marginal Homogeneity in Compositional Tables Based on Simplicial Geometry", *Further Developments of Information Geometry*, The University of Tokyo, Tokyo, Japan, 2025 (Poster session).

[2] K. Nakamura, T. Nakagawa, K. Tahata: "Orthogonal decomposition of probability tables with Aitchison geometry for symmetry assessment", *CFE-CMStatistics*, King's College London, London, UK, 2024.

5.2.2 Domestic Conferences

[1] K. Nakamura, T. Nakagawa, K. Tahata: "On symmetry of contingency tables based on Aitchison geometry", *RIMS Joint Research (Group Type A) - Statistical Models and Their Effectiveness*, Research Institute for Mathematical Sciences, Kyoto University, March 2025.

[2] K. Nakamura, T. Nakagawa, K. Tahata: "Quasi-symmetry analysis of cross-classified tables using Aitchison geometry", *Japanese Classification Society Annual Conference*, Nagoya Institute of Technology, November 2024.

[3] K. Nakamura, T. Nakagawa, K. Tahata: "Symmetry and skew-symmetry of square contingency tables based on Aitchison geometry", *Japanese Society of Applied Statistics Annual Conference*, Kyushu University, May 2024. **(Best Presentation Award)**

[4] K. Nakamura, T. Nakagawa, K. Tahata: "Quasi-symmetry and geometric marginal homogeneity of square contingency tables using Aitchison geometry", *The Mathematical Society of Japan Annual Meeting*, Tohoku University, September 2023.

[5] K. Nakamura, T. Nakagawa, K. Tahata: "Symmetry of square contingency tables using Aitchison geometry", *The Mathematical Society of Japan Annual Meeting*, Chuo University, March 2023.

5.3 Publications without Peer Review

[1] K. Nakamura, T. Nakagawa, K. Tahata: "On symmetry of contingency tables based on Aitchison geometry", *RIMS Kōkyūroku*, Vol. 2318, pp. 1-12, 2025.

6. Research Grants and Funding

[1] **Support for Pioneering Research Initiated by the Next Generation (SPRING)** by Japan Science and Technology Agency (JST) *2024 – Present*

7. Skills

- Statistical Analysis and Geometric Methods
- R Programming Language
- Statistical Modeling and Contingency Table Analysis

8. References

Prof. Kouji Tahata, Tokyo University of Science, tahata@rs.tus.ac.jp