YOSUKE MIZUTANI

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RESEARCH INTERESTS

Parameterized algorithms and graph theory.

EDUCATION

University of Utah, Salt Lake City, UT, USA   August 2020 – May 2025

    Ph.D. in Computer Science / Advisor: Blair D. Sullivan

    Dissertation: Provably Powerful Parameterized Preprocessing Towards Practice

    https://www.proquest.com/docview/3168506069

NC State University, Raleigh, NC, USA   August 2017 – May 2020

    B.S. in Computer Science with a minor in Mathematics / Summa Cum Laude

RESEARCH EXPERIENCE

University of Utah, Salt Lake City, UT, USA – *Research Assistant*   August 2020 – May 2025

- PACE 2023 Twin-Width: 1st place in the Exact Track and Theory Award.
- Parameterized approaches to the inspection planning problem in robotics.
- Preprocessing "beyond kernelization" for the odd cycle transversal problem.

NC State University, Raleigh, NC, USA – *Undergraduate Student Researcher*   January 2018 – May 2020

- Advisors: Matthias Stallmann and Aissa Oudjit
- The minimum independent dominating set problem; developing an exact solver.
- Facility location problems, including the p-median problem; integer programming.

The Institute of Statistical Mathematics, Tokyo, JAPAN – *Researcher*   August 2015 – December 2015

- Bibliometrics; data analysis of co-authoring relationship between ten years' published research papers.

WORK EXPERIENCE

Demand Side Science Co., LTD., Tokyo, JAPAN – *CTO / Senior VP / Full-stack Engineer*   April 2013 – November 2015

Nihon System Design Co., LTD., Tokyo, JAPAN – *Chief Server Engineer*   December 2003 – March 2013

MANUSCRIPTS

- R. O' Connor, J. Meintrup, M. Huber, M. Penschuck, A. Leonhardt, Y. Mizutani, O. Yeoh, D. Ajwani. A Learning Framework for Twin-Width and Related Problems. To be available on arXiv.
- M. Bentert, D. Coimbra Salomao, A. Crane, Y. Mizutani, F. Reidl, B. D. Sullivan. A Space-Efficient Algebraic Approach to Robotic Motion Planning. arXiv:2409.08219 [cs.RO].
- T.E. Reiter, L. Irber, A.A. Gingrich, D. Haynes, N. T. Pierce-Ward, P.T. Brooks, Y. Mizutani, D. Moritz, F. Reidl, A.D. Willis, B.D. Sullivan, C.T. Brown. Meta-analysis of metagenomes via machine learning and assembly graphs reveals strain switches in Crohn's disease. bioRxiv:10.1101/2022.06.30.498290.

PEER-REVIEWED PUBLICATIONS

- Y. Mizutani, D. Coimbra Salomao, A. Crane, M. Bentert, P.G. Drange, F. Reidl, A. Kuntz, B. D. Sullivan. Leveraging Fixed-Parameter Tractability for Robot Inspection Planning. *Proceedings of the 16th International Workshop on the Algorithmic Foundations of Robotics*, 2024.
- B.M.P. Jansen, Y. Mizutani, B.D. Sullivan and R.F.A. Verhaegh. Preprocessing to Reduce the Search Space for Odd Cycle Transversal. *Proceedings of the 19th International Symposium on Parameterized and Exact Computation*, 2024.
- S. Jain, Y. Mizutani, B. D. Sullivan. An Exponentially Smaller Kernel for Exact Weighted Clique Decomposition. *Proceedings of the SIAM Conference on Applied and Computational Discrete Algorithms*, 2023.
- Y. Mizutani, B. D. Sullivan. Parameterized Complexity of Maximum Happy Set and Densest k-Subgraph. *Proceedings of the 17th International Symposium on Parameterized and Exact Computation*, 2022.
- Y. Mizutani, A. Staker, B. D. Sullivan. Minimizing Congestion for Balanced Dominators. *Proceedings of the 28th ACM SIGKDD Conference on Knowledge Discovery and Data Mining*, 2022.
- Y. Mizukami, Y. Mizutani, K. Honda, S. Suzuki, J. Nakano. An international research comparative study of the degree of cooperation between disciplines within mathematics and mathematical sciences: proposal and application of new indices for identifying the specialized field of researchers. *Behaviormetrika*, 2017.

MAJOR PRESENTATIONS

International Workshop on the Algorithmic Foundations of Robotics (WAFR), Chicago, IL, USA — October 2024
        Leveraging Fixed-Parameter Tractability for Robot Inspection Planning

International Symposium on Parameterized and Exact Computation (IPEC), Amsterdam, Netherlands — September 2023
        Hydra Prime: A Twin-Width Solver for PACE 2023

Dagstuhl Seminar 23331: Recent Trends in Graph Decomposition, Wadern, Germany — August 2023
        Approximate Modular Decomposition for Practical Graph Preprocessing

SIAM Conference on Applied and Computational Discrete Algorithms (ACDA), Seattle, WA, USA — June 2023
        Clique Wrangler: Wrangling Gene Expression Data into Weighted Cliques (poster)

Joint Math Meetings (JMM 2023), Boston, MA, USA — January 2023
        Information Loss in Weighted Hypergraph Line Graphs and Clique Expansions

SIAM Workshop on Network Science (SIAM-NS), Online — September 2022
        Minimizing Congestion for Balanced Dominators

International Symposium on Parameterized and Exact Computation (IPEC), Potsdam, Germany — September 2022
        Some Happy FPT Results: Improved Parameterized Complexity of Happy Set Problems

ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), Washington DC, USA — August 2022
        Minimizing Congestion for Balanced Dominators

MAJOR ACTIVITIES

International Collegiate Programming Contest (ICPC)

Regional Judge | 2023-2024

Rocky Mountain Regional, Provo, UT, USA (representing the University of Utah) | October 2021

North America Championship, Atlanta, GA, USA (representing NC State University) | February 2020

University of Utah Kahlert School of Computing

Technical Coding Club Coach | 2022-2024

Czech Summer School on Discrete Mathematics

CSSDM24 (Twin-width, Poset Inequality), Prague, Czechia (awarded travel support) | July 2024

Parameterized Algorithms and Computational Experiments Challenge (PACE)

PACE 2023: Twinwidth (1st place in Exact Track/Theory Award) | June 2023

American Mathematical Society (AMS) Mathematics Research Communities

Models and Methods for Sparse (Hyper) Network Science, Buffalo, NY, USA | June 2022

TEACHING EXPERIENCE

Teaching Assistant

Graduate Algorithms (CS 5150/6150), University of Utah | Fall 2021, Fall 2022