

TA-WEI TU 塗大為

Taipei, Taiwan

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EDUCATION

National Taiwan University

B.S. in Computer Science and Information Engineering (CSIE)

Taipei, Taiwan

Sept. 2018 – June 2022

- Overall GPA: 4.19/4.30, Major GPA: 4.23/4.30. Top 5%.

RESEARCH INTEREST

I am interested in theoretical computer science in general, with a focus on the design and analysis of efficient static/dynamic algorithms for graph and combinatorial optimization problems.

PUBLICATIONS

- [1] Joakim Blikstad, Sagnik Mukhopadhyay, Danupon Nanongkai, and Ta-Wei Tu. Fast algorithms via dynamic-oracle matroids. Manuscript, 2022.
- [2] Ta-Wei Tu. Subquadratic weighted matroid intersection under rank oracles. In *33rd International Symposium on Algorithms and Computation (ISAAC 2022)*, volume 248 of *Leibniz International Proceedings in Informatics (LIPIcs)*, pages 63:1–63:14, 2022, [arXiv:2212.00508](https://arxiv.org/abs/2212.00508).

SELECTED HONORS

- 18th Place**, 2020 ICPC World Finals Moscow, Russia
- Two-time Champion**, 2018, 2020 ICPC Asia-Pacific Regional Contest, Taipei Site Taipei, Taiwan
- Three-time Champion**, 2018, 2019, 2020 National Collegiate Programming Contest Taipei, Taiwan
- 4th Place**, 2018 ICPC Asia-Pacific Regional Contest, Seoul Site Seoul, South Korea
- 8th Place**, 2018 Taiwan Olympiads in Informatics (TOI) Taipei, Taiwan

EXPERIENCE

Max Planck Institute for Informatics

Saarbrücken, Germany

Research Intern

Aug. 2022 – present

- Studied matroid-based problems including the spanning tree packing problem.
- Obtained matching algorithms for matroid intersection and improved algorithms for matroid union in a new *dynamic-oracle* model. This implies a unified approach to many fundamental problems such as graphic matroid intersection and an improved algorithm for finding disjoint spanning trees.
- Mentor: Prof. Danupon Nanongkai.

Lab of Algorithmic Research

Taipei, Taiwan

Undergraduate Research Assistant

Feb. 2021 – June 2022

- Studied various algorithmic problems (mostly related to graphs), including
 - * queue and stack layouts of planar graphs,
 - * induced subgraph (e.g., odd holes and odd paths) detection in planar graphs, and
 - * matroid intersection problem, especially the weighted version of it.
- Obtained the first subquadratic algorithm of the weighted matroid intersection problem under rank oracles.
- Advisor: Prof. Hsueh-I Lu.

Compiler Optimization, Virtualization, and Adaptive Runtime Lab

Taipei, Taiwan

Undergraduate Research Assistant

Sept. 2020 – Jan. 2021

- Studied the performance of RISC-V vector extension under different parameters and scheduling decisions.
- Advisor: Prof. Wei-Chung Hsu.

Google LLC

New Taipei City, Taiwan

Software Engineering Intern

June 2021 – Sept. 2021

- Implemented gRPC core transport using Android Binder for C/C++ (and its test suites).
- Benchmarked and optimized end-to-end performance.

- Ported internal experimental codes to upstream, open-sourced repository.

CSIE Network/System Administration Team

Section Chief, Workstation Services, System Administration Division

Taipei, Taiwan

Sept. 2021 – June 2022

- Led a five-person team responsible for daily maintenance of 10+ user-facing Linux workstations and handling various security issues.
- Organized internal training for future members.
- Advisors: Profs. Hsin-Mu Tsai, Hsu-Chun Hsiao, and Shang-Tse Chen.

TEACHING EXPERIENCE

National Taiwan University

Teaching Assistant, Algorithm Design and Analysis

Taipei, Taiwan

Fall 2019, 2020, 2021

- Designed and graded homework/exam problems.
- Hosted a weekly discussion session with students.
- Maintained an online judging system for programming problems.
- Received **Best TA Award** twice (2019, 2021).

Teaching Assistant, Compiler Design

Fall 2020

Teaching Assistant, Network Administration and System Administration

Spring 2021

Teaching Assistant, Programming Techniques

Fall 2021

Unofficial Teaching Assistant, Data Structures and Algorithms

Spring 2019

Unofficial Teaching Assistant, Computer Programming

Fall 2018

IOICamp

Lecturer / Problem Setter

Taipei, Taiwan

Winter 2020, 2021, 2022

- A training camp for prospective high school and college students participating in Olympiads in Informatics and other programming competitions.
- Lectured on dynamic programming techniques/tricks and advanced graph algorithms.

EXTRACURRICULAR ACTIVITY

National Problem Solving Contest

Judge / Problem Setter

Taipei, Taiwan

Fall 2019, 2020, 2021

National Taiwan University ICPC Team Ranking Contest

Judge / Problem Setter

Taipei, Taiwan

Fall 2021, 2022

PROFICIENT SKILLS

Programming Languages C, C++, Python, Rust, L^AT_EX.

Languages Chinese (native), English (fluent).

RELEVANT COURSEWORK

(* indicates graduate-level courses.)

Algorithm Design and Analysis, Data Structure and Algorithm,

Graph Theory, Special Topics on Graph Algorithms*,

Mathematical Analysis of Algorithms*, Quantum Algorithms*,

Theoretical Aspects of Modern Cryptography*, Topics in Complexity Theory*.