# Benyu Wang

Yao Class, Tsinghua University, Beijing, China

(+86) 156-3680-5108 | wang-by19@mails.tsinghua.edu.cn | wbyyui.github.io

## Interests

◦ Broad interest in **Theoretical Computer Science**.

◦ Study and research experience in **Algorithms** / **Combinatorics** / **Complexity Theory**

## Education

**Yao Class, Tsinghua University** **Beijing, China**

B.Eng. Candidate, Computer Science and Technology Aug 2019 – (exp.) Jul 2023

◦ **Special CS Pilot Class**, established by the Turing Award Laureate, **Prof. Andrew Yao**.

◦ GPA: **3.89**/4.00 (**33**/94) & For Yao Class courses only: **3.98**/4.00

◦ Advisor: *Prof. Ran Duan*

**Selected Courses**: (A+/A stand for 95-100 in 100-point values, A+ is the best grade)

· Mathematics for Computer Science (**A+**) & Mathematics for Artificial Intelligence (**A+**)

The **only one** to get both **A+** from the two courses instructed by **Prof. Andrew Yao** in Spring 2020.

· Core Courses: Theory of Computation (**A+**) & Design and Analysis of Algorithms (**A+**)

· Related Courses: Basic Topology (A) & Abstract Algebra (A+) & Game Theory (A) & Cryptography (A)

## Experiences

**University of Michigan** **Ann Arbor, USA**

Undergraduate Research Intern (Visitor) Feb 2022 – Aug 2022

◦ Visiting the theory group of UM. invited by *Prof. Seth Pettie*.

## Publications

**Tight Conditional Lower Bounds for Vertex Connectivity Problems**

Zhiyi Huang, Yaowei Long, Thatchaphol Saranurak, **Benyu Wang**

◦ Manuscript, submitted to STOC 2023. arXiv:2212.00359.

◦ We give **tight lower bounds** for vertex connectivity problems assuming the 4-Clique conjecture. We show that the all-pairs vertex connectivity problem has complexity $\hat{\Theta}(n^4)$ for combinatorial algorithms. We give hardness results for other vertex connectivity problems, which separate the hardness of these vertex connectivity problems and related edge connectivity problems. Moreover, We obtain lower bounds and algorithms for sparse graphs.

◦ In this project, with the guidance of Thatchaphol, I completed the final construction of reductions for all-pairs and Steiner vertex connectivity problems, and the balancing algorithm for sparse graphs.

## Teaching

**TA**, Design and Analysis of Algorithms (Graduate-Level Course), Fall 2022 Tsinghua University

## Selected Awards and Scholarships

**Excellent Academic** Scholarship & **Excellent Art** Scholarship of Tsinghua University 2022

**Excellent Voluntary and Public Service** Scholarship of Tsinghua University 2020

**Gold Medal** in Chinese Mathematical Olympiad (CMO) (ranked **86th** in China) 2018

**Silver Medal** in National Olympiad in Informatics (NOI) (ranked **90th** in China) 2018

## Skills

· Languages: Chinese (native) & English (fluent, 103 in TOEFL)

· Programming: LaTeX, C++, Python (proficient) / SQL, Verilog, Mathematica (familiar)