

Gerald Huang

Curriculum Vitae

Website: huanggerald.com

– Research Interests –

Algorithms (approximation, exact, lower bounds, parameterised), computational geometry and topology, complexity theory, combinatorics (algebraic, enumerative, extremal), combinatorial optimisation, number theory.

– Education –

- 2024 – 2028 **University of Melbourne**, Parkville, Melbourne, Australia.
Ph.D. in Computer Science; specialises in **algorithm and complexity theory**.
- **Supervisors:** Dr. Seeun William Umboh and Dr. Junhao Gan.
 - **Awards and Honours:** Australian Government Research Training Program Scholarship.
- 2018 – 2024 **University of New South Wales**, Sydney, New South Wales, Australia.
B. Sc. in Computer Science with Honours, B. Sc. in Mathematics (Pure Mathematics); specialised in **theory**.
- Distinction in Mathematics, Honours Class I in Computer Science Honours.
 - **Thesis:** *Quantum Algorithms for the Steiner Tree Problem* [\[paper\]](#) | [\[poster\]](#).
 - **Supervisor:** Prof. Serge Gaspers.
 - **Awards and Honours:** UNSW Taste of Research Scholar, 2022 – 2023.
 - Presented at the 2023 UNSW Thesis Showcase.

– Employment –

- Feb, 2024 **Lecturer**, *University of New South Wales*.
- **Course:** COMP3821/9801 – Extended Algorithm Design and Analysis.
- Dec, 2023 – May, 2024 **Research Assistant**, *University of New South Wales*.
- **Advisor:** Prof. Ron Van der Meyden.
 - **Project:** *Fault Tolerant Autonomy*.
- Nov, 2023 **Guest Lecturer**, *University of New South Wales*.
- **COMP3121/9101:** Algorithm Design and Analysis – Introduction to Dynamic Programming and its Applications to Games.
- Sep – Dec, 2023 **Course Administrator**, *University of New South Wales*.
- **COMP4418:** *Knowledge Representation and Reasoning*.

Feb, 2023 – Feb, 2024

Teaching Assistant, *University of Sydney*

- See [teaching].

Feb, 2021 – current

Teaching Assistant, *University of New South Wales*

- See [teaching].

– Publications –

Research

Each *published* paper can be accessed via the link if viewing on a desktop; they can also be accessed via my [website](#).

- [1] [Quantum Algorithms for the Steiner Tree Problem](#). With Serge Gaspers. 2023.
- [2] Implementation and Analysis of Quantified Boolean Formula Encodings for Planning and Verification Problems. With Abdallah Saffidine. 2022 – 2023.
- [3] Notes on the Union-Closed Sets Conjecture. With Thomas Britz. 2022.

Books

Books that I have either released or are in the process of being released. Chapter preprints are available on my [website](#).

- [1] *An Invitation to Algorithm Design and Analysis*. 1st edition, 2024.
- [2] *An Invitation to Combinatorics*. 1st edition, Springer Undergraduate Texts in Mathematics and Technology, 2024.
- [3] [ATAR Notes HSC Year 12 Mathematics Extension 1 Complete Course Notes](#). 1st edition, ATARNotes, 2020.
- [4] [ATAR Notes HSC Year 12 Mathematics Extension 1 Topic Tests](#). 1st edition, ATARNotes, 2020.

Notes and Articles

You can find a more complete set of notes and articles that I've written on my [website](#).

- [1] [Derandomisation and the Nisan-Wigderson Construction](#), September 2023.
- [2] [The Sunflower Lemma and its Modification](#), September 2023.

– Teaching –

Instruction

Number of students are shown and the overall evaluation of the instructor quality received from the cohort.

Term	Course number and title	Students	Rating
Term 1, 2024	COMP9801: Extended Algorithm Design and Analysis	95	
Term 1, 2024	COMP3821: Extended Algorithm Design and Analysis	13	

The rating (out of 6.0) comes from the students' evaluation of the instructor quality throughout the course. Undergraduate teaching is done through tutorials. Teaching is separated by university.

- Nominee for Award for Outstanding Contributions to Student Learning.

University of New South Wales

Course number and title	Year(s)	Average Rating
COMP2521: Data Structures and Algorithms	2023	5.34 / 6.0
COMP3121/9101: Design and Analysis of Algorithms	2021 – 2024	5.29 / 6.0
COMP3153/9153: Algorithmic Verification	2022, 2023	5.44 / 6.0
COMP3821/9801: Extended Design and Analysis of Algorithms	2021 – 2024	5.48 / 6.0
COMP3900/9900: Computer Science Project	2022, 2023	5.67 / 6.0
COMP4141: Theory of Computation	2023, 2024	5.63 / 6.0
COMP4418: Knowledge Representation and Reasoning	2022, 2023	N/A
COMP9020: Foundations of Computer Science	2024	N/A
MATH1041: Statistics for Life and Social Sciences	2023	N/A

University of Sydney

Course number and title	Year(s)	Average Rating
COMP2022: Models of Computation	2023	N/A
COMP3027: Algorithm Design	2023	N/A
COMP3927: Advanced Algorithm Design	2023	N/A

– Talks and Lectures –

Student Talks

Student talks that come from societies are marked with *, whilst student talks that come from conferences are marked with ◦.

- [1] *Expander Graphs**, Extended Algorithm
- [2] *Circuit Complexity: An Introduction**, Theory of Computation: Special Topic, April 2024.
- [3] *On the Transcendence of e* *, UNSW Mathematics Society, June 2023.
- [4] *When Combinatorics and Flow Networks Intersect**, UNSW Computer Science and Engineering Society, UNSW Competitive Mathematics and Programming Society, March 2023.

– Extra-curricular Activities –

Leadership and Societies

I have been involved in multiple leadership positions in faculty-focused societies.

- [1] *UNSW Mathematics Society*: Education Subcommittee (2019, 2022, 2023), Director of Education (2020), Society Executive (2021).
- [2] *UNSW Computer Science and Engineering Society*: Education Subcommittee (2023).

Reading Group

I am also actively involved in a reading group for *Advanced Topics in Theoretical Computer Science* run by the Faculty of Computer Science and Engineering.