

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 –

- 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) with Distinction; specialised in **theory**.*
- **Supervisor:** Prof. Serge Gaspers.
 - **Awards and Honours:** UNSW Taste of Research Scholar, 2023.
 - **Ranks:** 1st/941 in COMP3121/9101, 1st/162 in MATH2400, 2nd/138 in MATH3871/5219, 3rd/36 in MATH3361/5213, 4th/17 in MATH5515, 5th/25 in COMP3153/9153, 11th/73 in COMP4141.

– Employment –

- 2023 – 2024 **Research Assistant**, *University of New South Wales*.
- **Advisor:** Prof. Ron Van der Meyden.
 - **Project:** *Model checking – MCK*.
- 2023 – **Course Administrator**, *University of New South Wales*.
- **COMP4418:** *Knowledge Representation and Reasoning*.
- 2023 – **Teaching Assistant**, *University of Sydney*
- See [\[teaching\]](#).
- 2021 – **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 Steiner Trees. 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 –

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.

University of New South Wales

| Term | Course number and title | Rating (where applicable) |
|--------------|--|---------------------------|
| Term 3, 2023 | COMP9101: Design and Analysis of Algorithms | N/A |
| Term 3, 2023 | COMP4418: Knowledge Representation and Reasoning | N/A |
| Term 3, 2023 | COMP3121: Algorithms and Programming Techniques | N/A |
| Term 3, 2023 | COMP2521: Data Structures and Algorithms | |
| Term 3, 2023 | MATH1041: Statistics for Life and Social Sciences | N/A |
| Term 3, 2023 | Mathematics Drop-in Centre | N/A |
| Term 2, 2023 | COMP9900: Information Technology Project | 6.0 / 6.0 |
| Term 2, 2023 | COMP3900: Computer Science Project | 5.25 / 6.0 |
| Term 2, 2023 | COMP3153: Algorithmic Verification | 5.48 / 6.0 |
| Term 2, 2023 | COMP3121: Algorithms and Programming Techniques | 5.31 / 6.0 |
| Term 2, 2023 | Mathematics Drop-in Centre | N/A |
| Term 1, 2023 | COMP9101: Design and Analysis of Algorithms | 5.08 / 6.0 |
| Term 1, 2023 | COMP4141: Theory of Computation | 5.63 / 6.0 |
| Term 1, 2023 | COMP3821: Extended Algorithms and Programming Techniques | 5.51 / 6.0 |
| Term 1, 2023 | COMP3121: Algorithms and Programming Techniques | 5.48 / 6.0 |
| Term 1, 2023 | Mathematics Drop-in Centre | N/A |
| Term 3, 2022 | COMP9900: Information Technology Project | 5.75 / 6.0 |
| Term 3, 2022 | COMP9101: Design and Analysis of Algorithms | N/A |
| Term 3, 2022 | COMP4418: Knowledge Representation and Reasoning | N/A |

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| Term 3, 2022 | COMP3121: Algorithms and Programming Techniques | N/A |
| Term 3, 2022 | Mathematics Drop-in Centre | N/A |
| Term 2, 2022 | COMP9101: Design and Analysis of Algorithms | N/A |
| Term 2, 2022 | COMP3153: Algorithmic Verification | 5.40 / 6.0 |
| Term 2, 2022 | COMP3121: Algorithms and Programming Techniques | N/A |

University of Sydney

| Semester | Course number and title | Rating (where applicable) |
|------------------|-------------------------------------|---------------------------|
| Semester 2, 2023 | COMP2022: Models of Computation | N/A |
| Semester 1, 2023 | COMP3927: Advanced Algorithm Design | N/A |
| Semester 1, 2023 | COMP3027: Algorithm Design | 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 o.

- [1] [On the Transcendence of \$e\$](#) *, UNSW Mathematics Society, June 2023.
- [2] [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.