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.

– 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
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 ○.

[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.