



KIAH HAN MAO

My brain is open.

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TAUGHT

- Algorithm Analysis
- Combinatorics
- Linear Algebra
- Operations Research
- Math in Real-life Applications
- Probability
- Algorithms Design

CLASSROOM TOOLS

- WooClap
- Google Colab
- TurningPoint (Clicker)
- Cocalc (SageMath Cloud)
- Flipped Classroom
- Team-Based Learning

LANGUAGES

Proficient: Python, Sage-Math, LaTeX

Novice: Javascript, HTML

NTU STUDENT FEEDBACK ON TEACHING

All student feedback can be accessed here.

TEACHING PHILOSOPHY

What humans have to learn is not mathematics as a closed system but rather as an activity, the process of mathematising reality.

Freudenthal (1968) "How to Teach Mathematics so as to Be Useful"

EXPERIENCE

Assistant Professor | School of Physical and Mathematical Sciences
Nanyang Technological University

May 2015 – present Singapore

- Taught 30 courses, spanning 11 different course codes.
- Implemented a variety of pedagogical strategies like *flipped classroom* and *team-based learning*.
- Utilized interactive innovations like *CoCalc* and *WooClap*.
- Average Student Feedback Score: 4.68/5.
- Mentored high school research projects, including one that resulted in this preprint (arXiv:2108.09290)

- SPMS Teaching Excellence Award AY 2015-2016, AY 2016-2017, AY 2018-2019.
- International Symposium on Information Theory and Its Applications 2022 Early Career Researcher Paper Award Winner (Researcher: D. T. Dao)
- International Symposium on Information Theory and Its Applications 2020 Best Student Paper Award winner (Student: J. Chrisnata)

Postdoctoral Research Associate | Coordinated Science Laboratory
University of Illinois at Urbana-Champaign

Feb 2014 – Feb 2015 USA

Naval Officer | Republic of Singapore Navy

Jan 2006 – Jun 2010 Singapore

EDUCATION

PhD in Mathematics | Nanyang Technological University

2010 – 2014 Singapore

B. Sc. in Mathematics, 1st Class Honours, in Mathematics | National University of Singapore

2002 – 2006 Singapore

- Singapore Mathematical Society Medal and Prize, 2006
- Singapore National Academy of Science Award, 2006
- Dean's List, National University of Singapore, 2002-2006
- Lim Soo Peng Book Prize, 2004

SAMPLE OF COURSES TAUGHT

Mathematics in Real-World Application | [MH8300](#)

📅 Academic Year 2015–2020

- **Undergraduate course** with 300 to 400 students (including students from Business and Arts Schools).
 - **Topics covered:** Modular Arithmetic with applications to communication theory and cryptography. Graph theory with applications like DNA and PageRank.
 - **Flipped classroom** (pre-COVID-19)
 - Instructional content delivered via videos
 - Routine exercises conducted via an online platform
 - **Team-based learning**
 - In-class activities prioritized, focusing on real-life applications
 - For example, during one session, we orchestrated group exercises involving the implementation of the *Diffie-Hellman key exchange protocol*. Illustrated to students the concept of secure communication within a public environment.
 - **Average Student Feedback Score:** 4.63/5
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Algorithms for the Real World | [MH3400](#)

📅 Academic Year 2015-2018

- **Undergraduate course** with 50 to 60 students.
 - **Topics covered:** Algorithm analysis and design. Design techniques include divide-and-conquer and dynamic programming.
 - Unlike traditional algorithm courses, great emphasis placed on students' implementation of algorithms in Python
 - Designed exercises around implementation
 - Leveraged cloud platforms (like [CoCalc](#)) for real-time script debugging and feedback
 - Integrated TurningPoint for immediate student responses in lab sessions
 - **Average Student Feedback Score:** 4.74/5
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Operations Research | [MH6201/MH6202](#)

📅 Academic Year 2018 – 2023

- **Graduate course** with 50 to 70 students.
 - **Topics covered:** fundamental optimization techniques.
 - Integrated realism through the use of PuLP, a Python library for linear programming
 - Assignments designed to develop conceptual understanding by preventing correct solutions through direct calling of library functions
 - Final assignment required application of cutting-plane and branch-and-bound methods to solve Traveling Salesperson Problem (TSP)
 - **Average Student Feedback Score:** 4.67/5
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Combinatorics | [MH4300](#)

📅 Academic Year 2020 – 2022

- **Undergraduate course** with 10 to 20 students.
 - **Topics covered:** Combinatorics, the study of enumerating discrete structures.
 - Utilized Sedgewick and Flajolet's "Introduction to the Analysis of Algorithms" instead of traditional combinatorics texts
 - Employed advanced combinatorial techniques to analyze performance metrics of algorithms.
 - Designed assignments requiring students to use combinatorial techniques to evaluate algorithm performance
 - Demonstrated power of techniques in class using [Colab notebooks](#) for simple numerical experiments
 - **Average Student Feedback Score:** 4.87/5
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Linear Algebra 2 | [MH1201](#)

📅 Academic Year 2022 – 2023

- **Undergraduate course** with 200 to 300 students.
 - **Topics covered:** Abstract linear space, eigenvectors, inner product spaces.
 - Utilized [WooClap](#) for immediate student responses during lectures
 - Questions injected during lecture to emphasize key points and address misconceptions
 - **Average Student Feedback Score:** 4.48/5
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SERVICE CONTRIBUTIONS AT NTU

Outreach Representative

- Contributed to the design of publicity material
- Presented outreach talks, including a [public lecture in 2018](#) for Singapore Mathematical Society (SMS) Lecture series
- Engaged with students outside the classroom to learn about their experiences and accomplishments

House Leader

- Introduced for SPMS students in August 2021, the House system fosters a strong community of care and support.
- Selected as House leader to advise and oversee the House captain, the corresponding student leader
- Actively engage with House members to listen, empathize, and provide guidance