

# Hao-Ning Wu

## Affiliation

Department of Mathematics  
The University of Hong Kong  
Hong Kong SAR, China

## Contact Information

Mobile: (86) 155-2126-4756  
Email: [hnuwu@hku.hk](mailto:hnuwu@hku.hk)  
Web: [haoningwu.github.io](https://haoningwu.github.io)

## Research Interests

- Analysis, partial differential equations (PDEs) and integral equations, and their numerical analysis.
- Approximation theory, applied harmonic analysis, and their applications to mathematical data science.

**Specific Topics** include constructive approximation, orthogonal polynomials, high-dimensional numerical integration, spectral methods, boundary integral methods, learning theory, and compressed sensing/imaging.

## Education

- Ph.D. candidate (Mathematics), The University of Hong Kong: Jul 2023 (expected)  
Thesis title: Restricted isometry and information-based numerical analysis  
Advisor: Prof. X. Yuan
- B.Sc. (Mathematics), Jinan University, Guangzhou, China: Jun 2019

## Honors and Awards

- 2019 Doris Chen Postgraduate Scholarship (Dept of Mathematics, HKU)
- 2018 National Scholarship (Ministry of Education of the People's Republic of China)
- 2017 Two-year Elite-Undergraduate Training Program (JNU/top 1% in cohort 2015–2019)

## RESEARCH AND RELATED ACTIVITIES

### Research Visits

- Visiting Research Student, University of Sydney, Australia, hosted by Prof. D.-X. Zhou: Jan 9 – 27, 2023

### Publications and Preprints

The authorship order of all my coauthored works is alphabetical.

#### Journal Articles

5. Enhanced total variation minimization for stable image reconstruction, with C. An and X. Yuan.  
*Inverse Problems*, 39 (2023), 075005.
4. On the quadrature exactness in hyperinterpolation, with C. An.  
*BIT Numer. Math.*, 62 (2022), 1899–1919.
3. The springback penalty for robust signal recovery, with C. An and X. Yuan.  
*Appl. Comput. Harmon. Anal.*, 61 (2022), 319–346.
2. Lasso hyperinterpolation over general regions, with C. An.  
*SIAM J. Sci. Comput.*, 43 (2021), A3967–A3991.
1. Tikhonov regularization for polynomial approximation problems in Gauss quadrature points, with C. An.  
*Inverse Problems*, 37 (2021), 015008.

#### Preprints

- Breaking quadrature exactness: A spectral method for the Allen–Cahn equation on spheres, with X. Yuan.  
arXiv: 2305.04820

- Bypassing the quadrature exactness assumption of hyperinterpolation on the sphere, with C. An.  
arXiv: 2209.11012
- Is hyperinterpolation efficient in the approximation of singular and oscillatory functions?, with C. An.  
arXiv: 2205.08218

## Presentations

### Workshops and Conferences

- 15-min contributed talk, The 7th Workshop on Recent Advances on Spectral Methods and Related Applications, Beijing Computational Science Research Center, China, Jun 8 – 9, 2019

### Seminars and Colloquiums

- 45-min qualifying research seminar, Department of Mathematics, The University of Hong Kong, Jan 21, 2021

## Grants and Travel Support

### Proposal-Required Funding Schemes

- Travel Support for Research Postgraduate Students 2022/23 (Sept Round), HKU University Research Committee, 13,500 HKD: Jan 1 – 28, 2023
- National Undergraduate Innovation Research Grant 201710559017, *Research on barycentric interpolation: Algorithm and application*, 20,000 CNY: Aug 1, 2017 – Jul 31, 2018

## TEACHING AND RELATED ACTIVITIES

## Teaching

### Teaching Assistant Duties

**Certificate:** *Certificate of Teaching and Learning in Higher Education* (CTLHE), issued by the Centre for the Enhancement of Teaching and Learning (CETL), The University of Hong Kong, on Nov 8, 2019

**Responsibilities:** Offering weekly tutorials; preparing and grading assignments; holding office hours; and invigilating tests and exams

Spring 2023	MATH1013	University Mathematics II (HKU)
Fall 2022	MATH3901	Operations Research I (HKU)
Spring 2022	MATH1013	University Mathematics II (HKU)
Fall 2021	MATH3901	Operations Research I (HKU)
Spring 2021	MATH1009	Basic Mathematics for Business and Economics (HKU)
Fall 2020	MATH2101	Linear Algebra I (HKU)
Spring 2020	MATH1009	Basic Mathematics for Business and Economics (HKU)
Fall 2018	07010167	Numerical Linear Algebra (JNU)

## SERVICE AND RELATED ACTIVITIES

## Academic Service

### Referee for Journals

- Advances in Computational Mathematics (05/23)
- Numerical Algorithms (08/22)

### Misc

- Referee: S.T. Yau High School Science Award (Asia) (09/22, 09/21)

- Conference Assistant: Conference on Advances in Nonsmooth Analysis and Applications, Southern University of Science and Technology, Shenzhen, China (12/19)

### Membership of Learned Societies

- Society for Industrial and Applied Mathematics (since 2022)
  - SIAM Activity Group on Computational Science and Engineering
  - SIAM Activity Group on Orthogonal Polynomials and Special Functions

Last updated on June 2, 2023.