Xiang-Xiang Wang

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Research Interests: Algebraic Geometry, Computational Methods, Image Processing, Matrix Theory and Applications, Riemannian manifolds
Key Character: Efficient, Innovative, Patient, Communicative, Focused, Organized

EDUCATION

2021-Now	Ph.D. candidate in Applied Mathematics
	Department of Mathematics and Statistics, University of Nevada, Reno
	GPA: 4.00 (out of 4)
2017-2020	M.Sc. in Statistics
	Shanghai University
	Average Score: 90.25 (out of 100)
2013-2017	B.Sc. in Information and Computing Science
	North China University of Water Resources and Electric Power
	Consistently ranked first in my major each semester

RESEARCH EXPERIENCE

Ph.D. Researcher, University of Nevada, Reno 2021-present

Ph.D. Advisor: Tin-Yau Tam, University of Nevada, Reno

Investigated Grassmannians and their applications, leading to insights into their properties and ongoing research into their use in image processing. A draft of the research findings has been completed and is ready for submission.

Co-Author: Zhuoheng He, Shanghai University

Conducted research on quaternion matrices and quaternion tensor decompositions, exploring their applications in image and video processing. This work resulted in four publications in the *Journal of Scientific Computing*, *Journal of Computational and Applied Mathematics*, and *Advances in Applied Clifford Algebras*.

Statistical Analyst, Provost Office of University of Nevada, Reno June 2023-August 2023

Contributed to the Co-Requisite Assessment Program by managing and analyzing data. Utilized SPSS, R, and Python for data preparation and processing, and generated statistical reports to support informed decision-making and program evaluation.

Master Researcher, Shanghai University 2017-2020

Advisor: Qing-Wen Wang, Shanghai University

Researched quaternion matrices and eigenvalue problems, developed a fast algorithm for computing eigenvalues of large-scale quaternion matrices, and explored image processing applications. This work resulted in 1 publication in the *Journal of Scientific Computing*.

PUBLICATIONS

On-going project

- X.X. Wang, T.Y. Tam, Quaternion Grassmannians for Color Image Set Recognition.

Preprint

- T.Y. Tam, X.X. Wang, Geometric Means and Their Properties of Grassmannians. Preprint available on arXiv:

https://arxiv.org/abs/2412.15161.

Published

- Z.H. He, T.T. Liu, X.X. Wang, Eigenvalues of Quaternion Tensors: Properties, Algorithms and Applications, Advances in Applied Clifford Algebras, 35 (2025), 4 (23 pages).
- Z.H. He, W.L. Qin, J. Tian, X.X. Wang, Y. Zhang, A new Sylvester-type quaternion matrix equation model for color image data transmission, Computational and Applied Mathematics. 43 (2024), 227 (30 pages)
- Z.H. He, X.X. Wang, Y.F. Zhao, Eigenvalues of Quaternion Tensors with Applications to Color Video Processing, Journal of Scientific Computing. 94 (2023), 1(15 pages)
- Z.H. He, C. Navasca, X.X. Wang, Decomposition for a quaternion tensor triplet with applications, Advances in Applied Clifford Algebras, 32 (2022), 9 (19 pages).
- Z.H. He, W.L. Qin, X.X. Wang, Some applications of a decomposition for five quaternion matrices in control system and color image processing, Computational and Applied Mathematics, 40 (2021), 205 (29 pages).
- S.W. Yu, Z.H. He, T.C. Qi, X.X. Wang, The equivalence canonical form of five quaternion matrices with applications to imaging and Sylvester-type equations, Journal of Computational and Applied Mathematics, 393 (2021), 113494 (20 pages).
- Z.H. He, C. Chen, X.X. Wang, A simultaneous decomposition for three quaternion tensors with applications in color video signal processing, Analysis and Applications, 19 (3) (2020) 529-549 (21 pages).
- Q.W. Wang, X.X. Wang, Arnoldi method for large quaternion right eigenvalue problem, Journal of Scientific Computing, 82 (2020), 58 (20 pages).
- G.H. Peng, X.X. Wang, Y.Z. Zhang, Multidimensional scaling analysis based on attribute reduction of bivariate mutual information, International Mathematical Forum, 12 (3) (2017) 111-118 (9 pages).

TEACHING EXPERIENCE

Instructor of Record, University of Nevada, Reno Winter 2023, Summer 2023, Spring 2024

Course: Math 127 Precalculus II

Responsibilities: Developed and delivered two weekly 75-minutes lectures (over 100 students) and five weekly 3-hours lectures (20-30 students) in winter and summer semesters to non-majors from diverse backgrounds. Conducted instruction, setted up assignments and exams, evaluated performance, and submitted final grades.

Instructor of Record, University of Nevada, Reno Fall 2023

Course: Math 126E Precalculus I Expanded

Responsibilities: Designed and conducted five weekly 50-minutes lectures to new undergraduate students. Enhanced student engagement by implementing an encouragement and class bonus system.

Instructor of Record, University of Nevada, Reno Summer 2023, Fall 2024, Spring 2025

Course: Math 176 Introductory Calculus for Business and Social Sciences

Responsibilities: Delivered lectures focused on fundamental calculus concepts tailored to business students, emphasizing real-world applications in economics, finance, and social sciences. Designed assignments and exams that applied calculus to business scenarios, evaluated student performance, and provided comprehensive feedback.

Teaching Assistant, University of Nevada, Reno Fall 2022, Spring 2023

Course: Math 126 Precalculus I

Responsibilities: Overseeing instruction and evaluating quizzes

Teaching Assistant, University of Nevada, Reno Spring 2022

Course: Math 176 Introductory Calculus for Business and Social Sciences
Responsibilities: Overseeing instruction and evaluating quizzes

Grader, University of Nevada, Reno Fall 2021, Fall 2023
Course: Theory of Positive Integers
Responsibilities: Evaluating assignments for Professor Raúl Rojas González, a distinguished faculty member known for his expertise in number theory.

PEDAGOGICAL TRAINING

Seminar in Teaching Mathematics and Statistics Fall 2022
University of Nevada, Reno
This course is designed to prepare graduate students for success as teaching assistants in mathematics and statistics. The activities, discussions, and work are designed to be useful and practical during the first semester of teaching and beyond.

2024 NSHE Corequisite Conference April 25-26, 2024
Western Nevada College Carson City, USA
This conference provided a platform for educators to reflect on and celebrate their achievements, strengthen professional relationships, and expand their networks.

MENTORING EXPERIENCE

Mentor for Hongyang Dai, University of Nevada, Reno
Current status: Master student in the Department of Mathematics and Statistics at UNR
Mentor for Nancy Menzelthe, University of Nevada, Reno
Current status: Ph.D. student in the Department of Mathematics and Statistics at UNR

AWARDS

<u>Research Grants</u>	
Graduate Student Association (GSA) Research Grant Award, University of Nevada, Reno. ($1,000)	2021
Graduate Student Association (GSA) Travel Award, University of Nevada, Reno. ($500)	2022
<u>Fellowships</u>	
Graduate Dean's Merit Scholarship, University of Nevada, Reno. ($10,000)	2021
National Scholarship, China. (CNY 8,000)	2015
<u>Honors & Awards</u>	
College Graduate Excellence Award of Shanghai City, China.	2020
Excellent Student Award of Shanghai University, China.	2018
Third Prize in the 15th China Post-Graduate Mathematical Contest in Modeling, China.	2018
Outstanding Graduate Award of Henan Province, China.	2017
"Three Good Students" Award of General Higher Education in Henan Province.	2016
Second Prize in the Sixth National College Mathematics Competition, China.	2014

SERVICES

Local Organizer, The 2024 Workshop Matrices and Operators (Mao 2024), UNR June 2024

Organizer, Bi-Weekly Matrix Seminar Department of Mathematics and Statistics, UNR 2023-2024
Mentor, Nevada GAIN Program 2023
Journal Reviewer for

- Linear and Multilinear Algebra
- Advances in Operator Theory

PRESENTATIONS

Oral Presentations

- X.X. Wang, Quaternion Grassmannians for Color Image Set Recognition, Joint Mathematics Meetings (JMM 2025), Seattle, January 8-11, 2025.
- X.X.Wang, Some Properties of Geodesic Triangles in Grassmannians, The 2024 Workshop Matrices and Operators (MAO 2024), Reno, USA, June 14-17, 2024.
- X.X.Wang, Some Inequalities of Geometric Means in Grassmannians, Joint Mathematics Meetings (JMM 2024), San Francisco, January 3-6, 2024.
- X.X. Wang, Geometric means and their properties of Grassmannians, The 10th International Conference on Matrix Analysis and Applications (ICMAA), Kunming, China, August 15-18, 2023.
- X.X. Wang, Geometric means and their properties of Grassmannians, International Workshop on Matrix Analysis and Its Applications, Quynhon, Vietnam, July7-8, 2023.
- X.X. Wang, Arnoldi method for right eigenvalue problem of the large-scale quaternion matrices, Joint Mathematics Meetings (JMM 2023), Boston, January 4-7, 2023.
- X.X. Wang, Arnoldi method for right eigenvalue problem of the large-scale quaternion matrices, Joint Mathematics Meetings (JMM 2022), Seattle, January 5-8, 2022, postponed due to COVID-19 and held virtually, April 6-9, 2022.

Poster presentations

- X.X.Wang, Some Inequalities of Geometric Means in Grassmannians, 6th Annual GSA Poster Symposium. 2023.

CONFERENCES ATTENDED

1. The Association of Mathematics Teacher Educators (AMTE) 2025 Annual Conference, Grand Sierra Resort, Reno, NV, February 6–8, 2025.
2. Chair, Special Session on Matrix Analysis and Its Applications, Joint Mathematics Meetings (JMM 2025), Seattle, January 8-11, 2025.
3. The International Conference “Recent Progress in Operator Theory and Its Applications”, Research Institute for Mathematical Sciences (RIMS), Kyoto University, Japan, November 6–8, 2024 (Virtual).
4. The 2024 Workshop Matrices and Operators (MAO 2024), Reno, USA, June 14-17, 2024.
5. Western Canada Linear Algebra Meeting (WCLAM), Calgary, Canada, May 25-26, 2024 (Virtual).
6. 2024 NSHE Corequisite Conference, Carson City, USA, April 25-26, 2024.
7. Joint Mathematics Meetings (JMM 2024), San Francisco, January 3-6, 2024.
8. The 10th International Conference on Matrix Analysis and Applications (ICMAA), KunMing, China, August 15-18, 2023 (Virtual).
9. International Workshop on Matrix Analysis and Its Applications, Quynhon, Vietnam, July 7-8, 2023 (Virtual).

10. Joint Mathematics Meetings (JMM 2023), Boston, January 4-7, 2023.
11. International Conference on Matrix Theory with Applications (ICMTA), Jeju, Korea, December 1-5, 2022 (Virtual).
12. Second international workshop on Matrix Theory and Applications, hosted by the Departments of Mathematics: AKFA University-Uzbekistan, Sukkur IBA University-Pakistan, Naresuan University-Thailand and Bukhara State University-Uzbekistan, November 15-17, 2022 (Virtual).
13. International Workshop on Matrix Analysis and Its Applications (MAA 2022), Quy Nhon, Viet Nam, June 4, 2022 (Virtual).
14. Joint Mathematics Meetings (JMM 2022), Seattle, January 5-8, 2022, postponed due to COVID-19 and held virtually April 6-9, 2022.
15. The First NU-SIBAU International Workshop on Matrix Theory and Its Applications, hosted by the Department of Mathematics at Sukkur IBA University, Pakistan and the Department of Mathematics at Naresuan University, Thailand, October 15-17, 2021 (Virtual).
16. The 2021 China-Korea International Conference on Matrix Theory with Applications & the 6th International Workshop on Matrix Inequalities and Matrix Equations (IRCTMT-AORC Joint Meeting & MIME 2021), Hainan Normal University, Hainan, China, and Shanghai University, China, November 26-27, 2021 (Virtual).

PROFESSIONAL ORGANIZATION MEMBERS

Member, American Mathematical Society (AMS).

Member, International Linear Algebra Society (ILAS).

SKILL & INTERESTS

Computer Skills: MATLAB, LaTeX, R, Python, Excel, Word.

Teaching Tools: MyLab (Pearson), Zoom, Goodnotes, AirMedia.

Other Interests: Snowboard, Hiking, Running.