

# CURRICULUM VITAE

Zijian Diao

Mathematics Department, Ohio University  
45425 National Road, Saint Clairsville, OH 43950, USA  
diao@ohio.edu, (O)740-699-2351

## EDUCATION

**Ph.D.** in Mathematics, Texas A&M University, 2001

Dissertation: *Quantum Computing and Quantum Search Algorithms*

**M.S.** in Computer Science, University of Illinois, 2003

**B.S.** in Automation, University of Science and Technology of China, 1996

## ACADEMIC/INDUSTRY EXPERIENCE

**2005–present** Assistant/Associate Professor, Mathematics Department, Ohio University

**2019–2021** Faculty Chair, Eastern Campus, Ohio University

**2007, 2010** Visiting Scholar, Institute for Quantum Information Science, University of Calgary

**2003–2005** Visiting Assistant Professor, Department of Mathematics, Texas A&M University

**2001–2003** Research Assistant, Department of Computer Science, University of Illinois

**2001** Research Staff, IBM T.J. Watson Research Center

**1996–2000** Teaching Assistant, Department of Mathematics, Texas A&M University

**1994–1996** Research Assistant, Department of Automation, University of Science and Technology of China

## RESEARCH INTERESTS

Quantum computation and information theory, mathematical logic and foundations, statistics, statistical natural language processing, control theory.

## AWARDS

- Ohio University Faculty Fellowship, 2012 and 2022
- Ohio University Regional Higher Education Outstanding Professor Award, 2012
- Texas A&M University VIGRE Fellowship, 2000 and 2001
- Zhang Zongzhi Fellowship, University of Science and Technology of China, 1994
- Outstanding Student Award, University of Science and Technology of China, 1991 and 1992

## GRANTS

1. Principle Investigator, Technology Assisted Remote Instruction, Ohio University Eastern Campus Faculty Development Fund, \$900, 2020.
2. Principle Investigator, Statistics of Quantum Counting, Ohio University Regional Higher Education Research Fund, \$4,364, 2019.
3. Principle Investigator, 3D Printing Program at the Ohio University Eastern Campus, Ohio University Academic Innovation Accelerator Award, 2018.

4. Co-Principle Investigator, Investing in Today's Students for Tomorrow's Workforce: Expanding Student Internships, Service Learning and Research Opportunities, J. Prather, Z. Diao, S. Mahan-Hays, R. Waters, K. Chenoweth, and M. McTeague, Ohio University Konneker Fund for Learning and Discovery, \$30,000, 2013–2015.
5. Principle Investigator, Ohio University Eastern Campus Faculty Research Fund, \$1,000, 2014.
6. Principle Investigator, Ohio University Regional Higher Education International Travel Fund, \$1,000, 2012.
7. Principle Investigator, Research on Quantum Information Science, Ohio University Regional Higher Education Faculty Research Activity Fund, \$13,000, 2007–2010.
8. Principle Investigator, Exact Quantum Algorithms, Ohio University Regional Higher Education Teaching Load Reduction Grant, 12 credit hours, 2007–2008.
9. Principle Investigator, A Shared Learning Program in Mathematics at Ohio University Eastern, Z. Diao and J. Prather, Ohio University 1804 Fund, \$8,000, 2006–2008.
10. Principle Investigator, Analysis and Construction of Exact Quantum Algorithms, Ohio University Research Council Award, \$2,595, 2006–2007.
11. Principle Investigator, Collaborative Research-FRG: Mathematical Research On Quantum Computation and Technology, Ohio University Research Challenge Award, \$5,000, 2005–2006.
12. Co-Principle Investigator, Conference on Mathematics in Quantum Computation and Technology, G. Chen and Z. Diao, National Science Foundation, \$25,000, 2005–2006.
13. Co-Principle Investigator, Mathematical Study of Quantum Computation and Technology, G. Chen and Z. Diao, IMA-PI Conference, \$4,000, 2004–2005.

## PATENT

A Quantum Circuit Design for Grover's Algorithm, G. Chen, Z. Diao, and M.S. Zubairy, U.S. Patent No. 7,028,275.

## PROJECTS

**MARS** Prototype of MASTOR, the world's first speech translation system for bidirectional free-form speech, IBM T.J. Watson Research Center, 2001. Title: Chief Developer.

**LAMOST** Large Sky-Area Multi-Object Spectroscopic Telescope, a \$40,000,000 national astronomy project of China, Chinese Academy of Science, 1996. Title: Research Assistant.

## PUBLICATIONS

1. Z. Diao and C. Huang, Key statistical parameters of quantum counting algorithm, preprint.
2. Z. Diao, A quantum route to Basel:  $\sum \frac{1}{k^2}$  revisited, preprint.
3. J. Prather and Z. Diao, All about that base: a course on non-decimal number systems, preprint.
4. Z. Diao, An elementary proof of the irrationality of  $e$ , *American Mathematical Monthly*, 2020, **127(1)**, 84.
5. Z. Diao, C. Huang, and K. Wang, Quantum counting: algorithm and error distribution, *Acta Applicandae Mathematicae*, 118(1), 2012, 147–159.

6. Z. Diao, Exactness of the original Grover search algorithm, *Physical Review A*, 82, 2010, 044301.
7. Z. Zhang, G. Chen, Z. Diao, and P. Hemmer, NMR quantum computing, in *Advances in Applied Mathematics and Global Optimization: in Honor of Gilbert Strang*, D. Gao and H. Serali (editors), New York, 2009, 451–505.
8. Z. Diao, G. Chen, and P. Shiue, A realization scheme for quantum multi-object search, in *Mathematics of Quantum Computation and Technology*, G. Chen, L. Kauffman, and S. Lomonaco (editors), Chapman & Hall/CRC Press, 2007, 47–65.
9. G. Chen, Z. Diao, J. Kim, A. Neogi, Z. Zhang, and K. Urtekin, Quantum dot computing gates, *International Journal of Quantum Information*, 4, 2006, 233–296.
10. Z. Diao, Quantum computation, in *Handbook of Linear Algebra (Discrete Mathematics and Its Applications)*, L. Hogben (editor), Chapman & Hall/CRC Press, 2006, 62-1.
11. C.M. Bowden, G. Chen, Z. Diao, and A. Klappenecker, The universality of the quantum Fourier transform in forming the basis of quantum computing algorithms, *Journal of Mathematical Analysis and Applications*, 274/1, 2002, 69–80.
12. Z. Diao, M.S. Zubairy, and G. Chen, A quantum circuit design for Grover’s algorithm, *Zeitschrift fur Naturforschung A*, 57a, 2002, 701–708.
13. Y. Gao, B. Zhou, Z. Diao, J. Sorensen, and M. Picheny, MARS: a trainable multi-lingual speech-to-speech translation system, *Journal of Machine Translation*, 17, 2002, 185–212.
14. Y. Gao, B. Zhou, Z. Diao, J. Sorensen, H. Erdogan, R. Sarikaya, F. Liu, and M. Picheny, A trainable approach for multi-lingual speech-to-speech translation system, *Human Language Technology Conference 2002*, San Diego, CA.
15. B. Zhou, Y. Gao, J. Sorensen, Z. Diao, and M. Picheny, Statistical natural language generation for trainable speech-to-speech machine translation systems, *International Conference of Spoken Language Processing 2002*, Denver, CO.
16. G. Chen and Z. Diao, Quantum multi-object search algorithm with the availability of partial information, *Zeitschrift fur Naturforschung A*, 56a, 2001, 879–888.
17. G. Chen and Z. Diao, An exact quantum search algorithm, preprint, 2000.
18. Z. Diao and D. Sun, Research on some problems of independent modal space control, *Proceedings of 2nd Chinese World Conference on Intelligent Control and Intelligent Automation*, 1997, Xi’an, P.R. China, 579–584.

## CONFERENCE PRESENTATIONS, COLLOQUIA, AND SEMINARS

1. How to divide the raise pool, the 2023 Spring Meeting of the Mathematical Association of America Ohio Section, Baldwin Wallace University, Berea, OH, April 2023.
2. Parselmath 101, Faculty Research Seminar, Eastern Campus, Ohio University, Saint Clairsville, OH, April, 2021.
3. How do snakes multiply?, Indiana University Bicentennial Symposium, Indianapolis, IN, April 2020 (Canceled because of COVID-19 lockdown).
4. If Fourier had a quantum computer . . . , Analysis and Data Science Seminar, Department of Mathematics and Statistics, State University of New York at Albany, Albany, NY, March 2020.

5. All about that base, Graduate Seminar, Department of Mathematics and Statistics, State University of New York at Albany, Albany, NY, March 2020.
6. Arithmetic of base- $\infty$  numbers, the 2019 Fall Meeting of the Mathematical Association of America Ohio Section, Shawnee State University, Portsmouth, OH, October 2019.
7. A math education course on the Gonzo Math and factoradic, the 2019 Spring Meeting of the Mathematical Association of America Ohio Section, University of Akron, Akron, OH, April 2019.
8. Modern analysis on  $e$  and  $\zeta(2)$ , the 2018 Fall Meeting of the Mathematical Association of America Ohio Section, Malone University, Canton, OH, October 2018.
9. Modern analysis on  $e$  and  $\zeta(2)$ , the 8th Ohio River Analysis Meeting, University of Kentucky, Lexington, KY, March 2018.
10. How to search with a quantum computer, Quantum Information Seminar Series, Ohio State University, Columbus, OH, November 2017.
11. Trigonometry revisited or: If Fourier had a quantum computer, Department of Mathematics Colloquium, West Virginia University, Morgantown, WV, April 2016.
12. Trigonometry revisited or: If Fourier had a quantum computer, Math Club, Carnegie Mellon University, Pittsburgh, PA, March 2016.
13. The Basel problem revisited: a quantum probabilistic proof, Frontier Probability Days, University of Arizona, Tucson, AZ, May 2014.
14. How to search and count on a quantum computer, Condensed Matter and Surface Sciences Colloquium, Ohio University, Athens, OH, November 2013.
15. Conducting research while teaching on regional campuses: a personal account, AURCO 2013–Investing in Our Future, Lancaster Campus, Ohio University, Lancaster, OH, April 2013.
16. Solving quantum computing problems with trigonometry, AURCO 2012–Innovative Education for the Internet Generation, Zanesville Campus, Ohio University, Zanesville, OH, April 2012.
17. A journey into mathematics: Gauss’s toy, Euler’s tombstone, and Fourier’s counting machine, Faculty Research Seminar, Eastern Campus, Ohio University, Saint Clairsville, OH, March 2012.
18. Exactness of quantum search algorithms, NSF Conference–Mathematics Analysis and Control in Chemical Physics and Related Systems, University of Nevada at Las Vegas, Las Vegas, NV, December 2010.
19. Why are there very few “nice” angles for sine and cosine? Faculty Research Seminar, Eastern Campus, Ohio University, Saint Clairsville, OH, November 2010.
20. A primer to quantum computing, Weill Cornell Medical College in Qatar, Doha, Qatar, March 2009
21. How to count on a quantum computer, Mathematics Department, Indiana University, Bloomington, IN, February 2009.
22. Quantum counting, Statistics Department, Fudan University, Shanghai, China, December 2008.

23. A primer to quantum computing, Mathematics Department, Fudan University, Shanghai, China, November 2008.
24. Exactness of Grover's original quantum search algorithm, American Mathematical Society Annual Meeting, San Diego, CA, January 2008.
25. Quantum computing: how do photons bounce?, Mathematics Department, Colorado State University, Fort Collins, CO, December 2007.
26. Exact quantum algorithms of Grover's type, Key Laboratory of Quantum Information, University of Science and Technology of China/Chinese Academy of Sciences, Hefei, Anhui, China, August 2007.
27. Exact quantum algorithms of Grover's type, Institute for Quantum Information Science, University of Calgary, Calgary, Alberta, Canada, July 2007.
28. From quantum multi-object search to symmetric group generation, Conference on Mathematics of Quantum Computation and Quantum Technology, Texas A&M University, College Station, TX, November 2005.
29. Road map to 128-bit quantum factorization computer, Quantum Computing Technologies Group, Jet Propulsion Laboratory, Pasadena, CA, February 2004.
30. Remarks on Shor's factoring algorithm, Computer Science Department, Texas A&M University, College Station, TX, February 2004.
31. Quantum computing and quantum search algorithms, Computer Science Department, University of Illinois, Urbana-Champaign, IL, December 2002.
32. Quantum computing and quantum search algorithms, IBM T.J. Watson Research Center, Yorktown Heights, NY, March 2002.
33. Building a speech to speech translation system, IBM T.J. Watson Research Center, Yorktown Heights, NY, June 2001.

## **COURSES TAUGHT**

### **Ohio University**

MATH 3050 Discrete Mathematics  
 MATH 2500 Introduction to Statistics/Statistics and Probability  
 MATH 2301/2302 Calculus I/II  
 MATH 2110 Introductory Geometry for Middle School Teachers  
 MATH 1350 Survey of Calculus  
 MATH 1300 Pre-Calculus  
 MATH 1200 College Algebra  
 MATH 330A Foundations of Geometry  
 MATH 306 Foundation of Mathematics  
 MATH 263A/B/C/D Calculus I/II/III/IV  
 MATH 250 Introduction to Probability and Statistics  
 MATH 211 Elementary Linear Algebra  
 MATH 120 Elementary Topics in Mathematics  
 MATH 115 Pre-Calculus  
 MATH 113 Algebra

## **Texas A&M University**

MATH 602 Methods and Applications of Partial Differential Equations (TA)

MATH 601 Methods of Applied Mathematics (TA)

MATH 409 Advanced Calculus I (TA)

MATH 366 Structure in Mathematics II (TA)

MATH 308 Differential Equations

MATH 251 Calculus III

MATH 151/152/251 Calculus I/II/III (TA)

## **PROFESSIONAL SERVICES**

- Member, Committee on Section Activities (CONSACT), Ohio Section, the Mathematical Association of America, 2020–2023.
- Session Chair, the 2019 Spring Meeting of the Mathematical Association of America Ohio Section, University of Akron, Akron, OH, 2019.
- Co-organizer, the 2017 Fall Meeting of the Mathematical Association of America Ohio Section, Eastern Campus, Ohio University, Saint Clairsville, OH, 2017.
- External reviewer, Mathematics Department, Wright State University, 2013.
- Session Chair, AURCO 2013–Investing in Our Future, Lancaster Campus, Ohio University, Lancaster, OH, 2013.
- Special Sessions Chair, the 19th International Conference on Neural Processing, Doha, Qatar, 2012.
- Co-organizer, International Conference on Mathematical Theory of Quantum Computation and Technology, Texas A&M University, College Station, TX, 2005.
- Reviewer:

### **Funding Agencies/Organizations**

- Romanian National Council for Scientific Research
- Davidson Institute for Talent Development
- Ohio University Baker Fund
- Ohio University Research Council

### **Journals**

- *Abstract and Applied Analysis*
- *Entropy*
- *IEEE Transactions on Cybernetics*
- *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*
- *International Journal of Mathematics and Mathematical Sciences*
- *International Journal of Quantum Information*
- *Journal of Mathematical Analysis and Applications*
- *Journal of Supercomputing*
- *Neural Network World*

### **Conferences**

- International Conference on Neural Processing

- International Symposium on Neural Networks
- International Workshop on Advanced Computational Intelligence

## **UNIVERSITY SERVICES**

### **Ohio University**

- Council on Research, Scholarship and Creative Activity, 2022–present
- General Education Science, Technology, and Society Arch Workgroup, 2020 (Chair)
- One OHIO Integration Implementation Team, 2019–2020
- Interdisciplinary Council, 2011–2017
- Baker Fund Committee, 2009–2010
- Ohio University Research Council, 2007–2010

### **College of Arts and Sciences, Ohio University**

- Faculty Advisory Committee, 2023–present (Co-Chair)

### **Department of Mathematics, Ohio University**

- Faculty Fellowship Leave Evaluation Committee, 2023 (Chair)
- Award Nomination Committee, 2022–present (Chair)
- Staffing and Strategic Planning Committee, 2021–present
- Colloquium Committee, 2020–2022
- Search Committee, 2021
- Advisory Council, 2020–2021

### **Regional Higher Education, Ohio University**

- Outstanding Professor Selection Committee, 2012–2016 (Chair)
- Promotion and Tenure Committee, 2012–2013
- Research Work Team, 2011–2012

### **Eastern Campus, Ohio University**

- Faculty Development Committee, 2018–present (Chair, 2019–present)
- Faculty Mentorship and Advocacy Committee, 2022–present
- Scholarship Committee, 2016–2018, 2020–2022
- Long-Range Planning Committee, 2013–2014, 2020–2022
- Culture Life and Diversity Committee, 2018–2021
- Dean Search Committee, 2013, 2020 (Chair)
- Promotion and Tenure Committee, 2011–2017 and 2018–2019 (Chair, 2015–2017 and 2018–2019)
- Salary Committee, 2011–2013, 2017–2019 (Chair, 2018–2019)
- Research Committee, 2009–2017 (Chair, 2009–2012)
- Health Services Search Committee, 2016 and 2017
- Dean Evaluation Committee, 2016
- Career Teaching Faculty Promotion Committee, 2014–2015
- Physics Search Committee, 2014
- Enrollment Management and Retention Committee, 2013–2014 (Chair)
- Chemistry Search Committee, 2012 (Chair) and 2013 (Chair)

- Internship and Career Specialist Search Committee, 2013
- Transfer Coordinator Search Committee, 2013
- OUE Webpage Renovation Committee, 2013
- Faculty Professional Development and Support Committee, 2005–2008
- Technology and Information Resources Committee, 2006–2007

#### **PROFESSIONAL ASSOCIATIONS**

- Member, American Mathematical Society
- Member, Mathematical Association of America
- Member, Ohio Academy of Science
- Project NExT Fellow, Ohio Section, Mathematical Association of America