

# Qingyun Zeng

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## CONTACT INFORMATION

Department of Mathematics  
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## RESEARCH INTERESTS

Higher/derived structures in geometry and topology, homotopy theory of  $L_\infty$  groupoids/algebroids, noncommutative geometry,  $K$ -theory and index theory, and mathematical physics

## EDUCATION

### University of Pennsylvania

*Doctor of Philosophy in Mathematics* (expected July 2021)  
Advisor: Professor Jonathan Block

### University of Cambridge

*Master of Advanced Studies in Pure Mathematics*

- Wing Yip Scholar
- Fully supported by Cambridge Trust scholarship
- Director of study: Professor Neshan Wickramasekera

### Chongqing University, George Mason University

*Bachelor of Arts in Mathematics* (honors), Summa Cum Laude  
*Bachelor of Science in Economics*, Summa Cum Laude  
*Bachelor of Economics*, concentration on business economics

- Howard R. Bloch Memorial Award
- Klaus Fischer Award
- GPA: 4.00/4.00

## ACADEMIC TALKS

*Homotopy theory of derived Lie  $\infty$ -groupoids with applications to singular foliations*, Elliptic cohomology days, University of Illinois Urbana-Champaign

*Derived differential geometry: from manifolds to derived  $\infty$ -stacks*, The 44th Annual New York Regional Graduate Mathematics Conference, Syracuse University. (March 2019)

*Operads,  $A_\infty$  spaces,  $E_\infty$  spaces, recognition principles, and their connections to  $E_\infty$ -ring spectra*, Homotopy theory and K-theory seminar, University of Pennsylvania. (Nov 2018)

*Quillen's higher algebraic K-theory and '+ = Q' theorem*, Homotopy theory and K-theory seminar, University of Pennsylvania. (Oct 2018)

*Differentiable stacks, Lie groupoids, and gerbes*, The 43rd Annual New York Regional Graduate Mathematics Conference, Syracuse University. (March 2018)

*Isoperimetric inequality and Weyl's equidistribution formula*, Fourier analysis learning seminar, University of Pennsylvania. (July 2016)

*Chebyshev series and Radau polynomials method in nonlinear differential equations*, Part III seminar, University of Cambridge. (December 2014)

*Chebyshev series method in solving nonlinear differential equations with application to Lorenz system*, , George Mason University. (December 2013)

OTHER TALKS

*A mathematical approach to the form and color of music*, CamTalk seminar, University of Cambridge. (October 2014)

*Study experience and tips for new undergraduate students*, Sino-American CHEPD Annual Meeting, China Education Association for International Exchange. (August 2014)

CONFERENCE AND WORKSHOPS ATTENDED

*International Workshop on Algebraic Topology*. Shanghai Center for Mathematical Sciences & School of Mathematical Sciences. (Aug 2019)

*Elliptic cohomology days*. UIUC. (Jun 2019)

*The 55th Topology Festival*, Cornell University. (May 2019)

*Operator Algebras in the Twenty-First Century*, University of Pennsylvania. (March 2019)

*The 44th Annual New York Regional Graduate Mathematics Conference*, Syracuse University. (March 2019)

*Arizona Winter School 2019: Topology and Arithmetic*. University of Arizona. (Mar 2019)

*Texas Geometry and Topology Conference*. Texas Christian University. (Feb 2019)

*CIMPA School on Noncommutative geometry and Index theory*, CIMAT, Mexico. (Dec 2018)

*D-module and Hodge theory workshop*, University of Illinois at Chicago, Chicago. (Nov 2018)

*K-Theory conference Argentina 2018*, Universidad Nacional de La Plata. (Jul 2018)

*Conference on symplectic geometry and its interaction with low-dimensional topology*, Princeton University. (Jun 2018)

*Princeton RTG school on low-dimensional topology and symplectic geometry*, Princeton University. (Jun 2018)

*Fourth Annual Graduate Student Conference in Algebra, Geometry, and Topology*, Temple University. (Jun 2018)

*The 54th Topology Festival*, Cornell University. (May 2018)

*The fifth annual Mid-Atlantic Algebra, Geometry, and Combinatorics (MAAGC) Workshop*, Drexel University. (April 2018)

*The 33rd Annual Geometry Festival*, University of Pennsylvania. (Apr 2018)

*The 43rd Annual New York Regional Graduate Mathematics Conference*, Syracuse University. (March 2018)

*Joint Princeton Rutgers Geometric PDEs Seminar*, Princeton University. (Nov 2016)

*Southern California Analysis and PDE Conference 2018*, UCLA. (Sep 2016)

*Generalized Geometry Workshop*, Swarthmore College. (Sep 2016)

*Summer School of Geometric Analysis of Waves and Fluids*, Massachusetts Institute of Technology. (Jun 2016)

*International Congress of Industrial and Applied Mathematics(ICIAM) 2015*, Beijing. (Aug 2015)

*International Summer School on Pure and Applied Mathematics: differential topology,  $C^*$  algebra, complex geometry and Kahler manifolds, 2D statistical physics, automorphic forms*, Harbin Institute of Technology. (Jul 2015)

*SIAM Chapter Faculty Research Symposium*, George Mason University. (Oct 2013)

HONORS AND  
AWARDS

- 2015-2020     **Benjamin Franklin Fellowship**, Department of Mathematics, University of Pennsylvania
- 2015           **Wing Yip Travel Grant**, Wing Yip Foundation
- 2014           **Wing Yip Cambridge Scholarship**, Cambridge Trust, University of Cambridge
- Howard R. Bloch Memorial Award** for the highest academic achievement in economics, Department of Economics, George Mason University
- The Excellent Graduate of the Year 2014**, China Education Association for International Exchange
- 2013           **Klaus Fischer Award** for the highest academic achievement in mathematics, Department of Mathematical Science, George Mason University
- 2013           **Phi Beta Kappa**
- Phi Kappa Phi**
- 2012           **Vernon Smith Essay Contest 2nd Place**, Department of Economics, George Mason University
- 2011-2013     **Dean's List** (2011 fall, 2012 spring, 2012 summer, 2012 fall, 2013 spring, 2013 summer, 2013 fall)
- 2011-2013     **GMU China121 scholarship**, George Mason University
- 2011           **Star Student**, George Mason University English Language Institute

TEACHING  
EXPERIENCE

Fall 2019      **Math 500 Topology**  
                     As *TA*.

Spring 2019    **Math Center Calculus Help**  
                     As *Tutor at King's Court English College House*

Summer 2019    **Caculus Problem Session**  
                     As *instructor*.

Spring 2019    **Math Center Calculus Help**  
                     As *Tutor at Gregory College House*

Fall 2018       **Math Center Calculus Help**  
                     As *Tutor at Kings Court/English College House*

Summer 2018    **Caculus Problem Session**  
                     As *instructor*.

Spring 2018    **Math 370 Abstract algebra I**  
                     As *Teaching assistant*. Taught 2 problem sessions.

**Math Center Calculus Help**  
                     As *Tutor at Gregory College House*

Fall 2017       **Math 500 Topology**(graduate course)  
                     As *Teaching assistant*.

**Math Center Calculus Help**  
                     As *Tutor at Gregory College House*

Summer 2017    **Math 241 Calculus IV**(applied partial differential equations)  
                     As *instructor*.

Spring 2017    **Math 241 Calculus IV**(applied partial differential equations)  
                     As *Teaching assistant*. Taught 4 sections of recitations

**Math Center Calculus Help**  
                     As *Tutor at Gregory College House*

Fall 2016       **Math 241 Calculus IV** (applied partial differential equations)  
                     As *Teaching assistant*. Taught 4 sections of recitations

**Math Center Calculus Help**  
                     As *Tutor at Gregory College House*

Spring 2016    **Math Center Calculus Help**  
                     As *Tutor at Ware College House*

GRADUATE  
 COURSEWORK

*At George Mason University*

- |                                                     |                                                 |
|-----------------------------------------------------|-------------------------------------------------|
| <input type="checkbox"/> Fourier Analysis           | <input type="checkbox"/> Measure Theory         |
| <input type="checkbox"/> Linear functional Analysis | <input type="checkbox"/> Mathematical Economics |

*At University of Cambridge*

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|-------------------------------------------------------|---------------------------------------------------------------------|
| <input type="checkbox"/> Algebraic topology           | <input type="checkbox"/> Advanced Probability                       |
| <input type="checkbox"/> Differential Geometry        | <input type="checkbox"/> Analysis of Partial Differential Equations |
| <input type="checkbox"/> Advanced Functional Analysis | <input type="checkbox"/> Elliptic Partial Differential Equations    |
| <input type="checkbox"/> Distribution Theory          | <input type="checkbox"/> BVP for linear elliptic and evolution PDEs |

*At University of Pennsylvania*

- Smooth Manifolds
- Real Analysis
- Applications of PDEs to Geometry
- Algebra I,II
- Algebraic Geometry I
- Probability theory
- Homotopy theory
- Complex algebraic geometry I,II
- Stochastic Processes
- Complex Analysis
- Riemannian Geometry I,II
- Algebraic Topology
- Partial differential equations I,II
- Minimal submanifolds
- Representation of Continuous Groups
- Factorization algebras in QFT I,II
- Hermitian Yang-Mills on complex manifolds
- Topics in minimal surfaces

RESEARCH AND PROJECT

2014 Nonlinear game and action strategy analysis of competition in global smartphone market.  
 Advisor: Yulin Liu, Department of Economics and International Trade, Chongqing University.

2013 Chebyshev series, numerical verification, and radii polynomials method in nonlinear analytic differential equations with application to Lorenz system.  
 Advisor: Robert Sachs, Department of Mathematical Sciences, George Mason University.

ACTIVITIES AND INTERESTS

2016-2017 *F.C.F.T. Band at UPenn*

- Lead guitarist,
- Attended two live shows

2014-2015 *Chinese Elite Football club (CUCE) at Cambridge*

- Midfield/Wing player
- Played at Cambridge University Association Football League Division V.

2010-2014 *L.A.T.E. Band*

- Founder and lead guitarist,
- Held a 'Perfect Summer' live concert with 2K audience in Xipeng, Chongqing in Aug 2014.

2011-2013 *Mason United Football Club*

- Tournament captain and club official
- Attended Fall 2011, Spring 2012, Fall 2012, Spring 2013, Fall 2013 Intramural Soccer League of George Mason University
- Final 4 in Fall 2013 season (as captain), and 3rd place in 2012 I-week Tournament

2011-2013 *China Students and Scholars Association at George Mason University*

- Sports coordinator
- Founded Mason Chinese Soccer Team, and captained the team for DC Chinese College Students Soccer League which we got 2nd place finally

PROFESSIONAL SKILLS

Languages: English (fluent), Chinese (Native)

Programming Skills: Java, Python, OCaml, R, SAS, Stata, Mathematica,  $\LaTeX$

Interest: Guitar, soccer, photography, astronomical observing