

# LEI ZHANG

Sun Yat-Sen University, School of Mathematics (Zhuhai)  
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## PERSONAL INFORMATION

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DATE OF BIRTH July 16, 1983

GENDER Male

## MATHEMATICAL INTERESTS

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My research area is number theory and arithmetic geometry. More specifically, I am interested in applying categorical methods, such as Tannakian categories, stacks, infinity categories, to problems in arithmetic and geometry.

## EMPLOYMENT

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SUN YAT-SEN UNIVERSITY *Sep. 01. 2022 - Present*  
Associate Professor

THE CHINESE UNIVERSITY OF HONG KONG *Oct. 23. 2022 - Aug. 31. 2022*  
Research Associate

THE CHINESE UNIVERSITY OF HONG KONG *Oct. 23. 2018 - Oct. 22. 2022*  
Research Assistant Professor

FREIE UNIVERSITÄT BERLIN *Nov. 01. 2012 - Oct. 22, 2018*  
Post-doc

UNIVERSITÄT DUISBURG-ESSEN *Jul. 17. 2012 - Sep. 30. 2012*  
Post-doc

## EDUCATION

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UNIVERSITÄT DUISBURG-ESSEN *Oct. 01. 2009 - Jul. 16. 2012*  
PhD student under the supervision of Professor H el ene Esnault  
THESIS TITLE: *The homotopy sequence for fundamental groups*  
Doctor's degree awarded by Fakult at f ur Mathematik on July 16, 2012

CAPITAL NORMAL UNIVERSITY *Sep. 2006 - Jun. 2009*  
Master Student under the supervision of Professor Kezheng Li  
THESIS TITLE: *Left Invariant Differential Operators*  
Master's degree awarded by College of Mathematical Science in June 2009.

CHINA UNIVERSITY OF MINING AND TECHNOLOGY *Sep. 2002 - Jun. 2006*  
Bachelor student in Financial Mathematics

Bachelor's degree awarded by College of Science in June 2006.

## PREPRINTS AND PUBLICATIONS

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- (1) L. Zhang, *The Homotopy Sequence for Nori's Fundamental Group*.  
Journal of Algebra, Vol. 393, pp. 79 - 91, 2013.  
doi: <https://doi.org/10.1016/j.jalgebra.2013.07.010>
- (2) L. Zhang, *The Homotopy Sequence for the Algebraic Fundamental Group*.  
International Mathematics Research Notices, no. 22, 6155-6174, 2013.  
doi: [10.1093/imrn/rnt163](https://doi.org/10.1093/imrn/rnt163)
- (3) L. Zhang, *Nori's Fundamental Group over a non-algebraically Closed Field*.  
Annali della Scuola Normale Superiore di Pisa - Classe di Scienze (5), 18 , no. 4, 1349–1394, 2018.  
doi: [10.2422/2036-2145.201604\\_007](https://doi.org/10.2422/2036-2145.201604_007)
- (4) F. Tonini, L. Zhang, *Algebraic and Nori Fundamental Gerbes*.  
Journal of the Institute of Mathematics of Jussieu, 1-43, 2019  
doi:[10.1017/S147474801700024X](https://doi.org/10.1017/S147474801700024X)
- (5) F. Tonini, L. Zhang, *F-divided sheaves trivialized by dominant maps are essentially finite*.  
Transactions of the American Mathematical Society, 371, 1-22, 2019.  
doi: <https://doi.org/10.1090/tran/7444>
- (6) M. Antei, I. Biswas, M. Emsalem, F. Tonini, L. Zhang (corresponding author), *Nori fundamental gerbe of essentially finite covers and Galois closure of towers of torsors*.  
Selecta Mathematica, 25, no. 2, Art. 18, 37 pp., 2019.  
doi: <https://doi.org/10.1007/s00029-019-0449-z>
- (7) F. Tonini, L. Zhang, *Essentially Finite Vector Bundles on Normal Pseudo-proper Algebraic Stacks*.  
Documenta Mathematica, 25, 159-169, 2020.  
doi: [10.25537/dm.2020v25.159-169](https://doi.org/10.25537/dm.2020v25.159-169)
- (8) M. Romagny, F. Tonini, L. Zhang, *The arithmetic local Nori fundamental group*.  
To appear in *Transactions of the American Mathematical Society*, 2021.  
doi: <https://doi.org/10.1090/tran/8504>
- (9) V. Di Proietto, F. Tonini, L. Zhang, *A crystalline incarnation of Berthelot's conjecture and Künneth formula for isocrystals*.  
To appear in *Journal of Algebraic Geometry*, 2021.  
doi: <https://doi.org/10.1090/jag/789>
- (10) S. Otabe, F. Tonini, L. Zhang, *A generalized Abhyankar's conjecture for simple Lie algebras in characteristic  $p > 5$* .  
To appear in *Mathematische Annalen*, 2021.  
doi: <https://doi.org/10.1007/s00208-021-02269-5>
- (11) V. Di Proietto, F. Tonini, L. Zhang, *Frobenius fixed objects of moduli*.  
Submitted.
- (12) M. Lara, J-K. Yu, L. Zhang, *A theorem on meromorphic descent and the specialization of the pro-étale fundamental group*.  
Submitted.
- (13) J-K. Yu, L. Zhang, *A Comparison Theorem for the Pro-Étale Fundamental Group*.  
Submitted.

## GRANTS

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- (1) General Research Fund 14301019 from University Grants Committee, *The local fundamental group*, 2020-2022.
- (2) Direct Grant 4053343 from College of Science of The Chinese University of Hong Kong, *The pro-étale fundamental group*, 11.2018-11.2020.

## TEACHING EXPERIENCE

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- (1) Course: *Commutative Algebra*, Sun Yat-Sen University, 2022-2023 Term II.
- (2) MATH1030E - *Linear Algebra I*, The Chinese University of Hongkong, 2020-21 Term 2.
- (3) MATH1030E - *Linear Algebra I*, The Chinese University of Hongkong, 2019-20 Term 2.
- (4) MATH1030H - *Linear Algebra I*, The Chinese University of Hongkong, summer course, 2018/2019.
- (5) Exercise session for the course *Algebraic Number Theory II*, Freie Universität Berlin, summer semester 2018.
- (6) Seminar: *Quadratische Formen* (in English *Quadratic Forms*), Freie Universität Berlin, summer semester 2018. This seminar was in German.
- (7) Course: *Crystals and Crystalline Cohomology*, Freie Universität Berlin, winter semester 2017.
- (8) Seminar: *p-adische Zahlen* (in English *p-adic Numbers*), Freie Universität Berlin, summer semester 2017. This seminar was in German.
- (9) Exercise session for the course *Algebraic Number Theory II*, Freie Universität Berlin, summer semester 2017.
- (10) Course: *Étale Cohomology*, Freie Universität Berlin, winter semester 2016-2017.
- (11) Course: *Algebraic Groups*, Freie Universität Berlin, summer semester 2016.
- (12) Seminar: *Analytic Methods in Number Theory*, Freie Universität Berlin, winter semester 2015-2016.
- (13) Exercise session for the course *Elliptic Curves*, Freie Universität Berlin, winter semester 2015-2016.
- (14) Seminar: *Quadratic Forms*, Freie Universität Berlin, summer semester 2015.
- (15) Exercise session for the course *Algebraic Number Theory II*, Freie Universität Berlin, summer semester 2015.
- (16) Exercise session for the course *Algebraic Number Theory II*, Freie Universität Berlin, winter semester 2014-2015.
- (17) Student seminar *p-adic Numbers*, Freie Universität Berlin, winter semester 2014-2015.
- (18) Teaching assistant of Prof. Dr. Hélène Esnault for the master course *Algebraic Number Theory*, Freie Universität Berlin, summer semester 2014.
- (19) Teaching assistant of Prof. Dr. Hélène Esnault for the master course *Commutative Algebra I*, Freie Universität Berlin, winter semester 2013-2014.
- (20) Teaching assistant of Prof. Dr. Hélène Esnault for the master course *Algebraic Number Theory II*, Freie Universität Berlin, summer semester 2013.
- (21) *Lern- und Diskussionszentren* (LuDi), Universität Duisburg-Essen, summer semester 2012.
- (22) Teaching assistant of Prof. Dr. Hélène Esnault and Prof. Dr. Moritz Kerz for the master course *Algebraic Geometry III*, Universität Duisburg-Essen, summer semester 2011.

## STUDENTS

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- (1) 2020, Li Kin Lok, bachelor thesis: *Integral closure of finitely generated algebra*, The Chinese University of Hong Kong.
- (2) 2018, Ragnarsson Amazeen, master thesis: *Étale and proétale fundamental groups*, Freie Universität Berlin.
- (3) 2018, Janine Schuhmann, bachelor thesis: *Klassifikation von quadratischen Form über  $\mathbb{Q}_p$ ,  $\mathbb{Q}$  und  $\mathbb{R}$* , Freie Universität Berlin.

## LANGUAGE

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Mandarin Chinese:



English:



German:



French:

