

# TONY FENG

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## EMPLOYMENT

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Assistant Professor, University of California, Berkeley	2022-Present
C.L.E. Moore Instructor, Massachusetts Institute of Technology	2019-2022
NSF Postdoctoral Fellow	2019-2022

## VISITING POSITIONS

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Viterbi Postdoctoral Fellow, MSRI	2023
Member, Institute for Advanced Study	2020-2021

## EDUCATION

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<b>Stanford University</b> Ph.D. in Mathematics Advisor: Akshay Venkatesh	2014-2019
<b>University of Cambridge</b> MASt Mathematics ( <i>with distinction</i> )	2013-2014
<b>Harvard University</b> A.M. and A.B. in Mathematics ( <i>summa cum laude</i> )	2009-2013

## PUBLICATIONS

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1. Modularity of higher theta series II: Chow group of the generic fiber (with Adeel Khan). *Preprint*.
2. Geometric Langlands duality for periods (with Jonathan Wang). *Preprint*.
3. Modular functoriality in the Local Langlands correspondence. *Preprint*.
4. Mirror symmetry and the Breuil-Mézard Conjecture (with Bao Le Hung). *Preprint*.
5. Modularity of higher theta series I: cohomology of the generic fiber (with Zhiwei Yun and Wei Zhang). *Preprint*.
6. G-spectra of cyclic defect (with David Treumann and Allen Yuan). *Preprint*.
7. Cyclic base change of cuspidal automorphic representations over function fields (with Gebhard Böckle, Michael Harris, Chandrashekar Khare, Jack A. Thorne). To appear in *Compositio Mathematica*.
8. Higher theta series for unitary groups over function fields (with Zhiwei Yun and Wei Zhang). *Preprint*. To appear in *Annales scientifiques de l'École normale supérieure*.
9. Higher Siegel–Weil formula for unitary groups: the non-singular terms (with Zhiwei Yun and Wei Zhang). *Invent. Math.* 235 (2024), no. 2, 569–668.
10. Smith theory and cyclic base change functoriality. *Forum Math. Pi* 12 (2024), Paper No. e1.
11. The Galois action on symplectic  $K$ -theory (with Soren Galatius and Akshay Venkatesh). *Invent. Math.* 230 (2022), no. 1, 225–319.

12. The geometric distribution of ranks, Selmer groups, and Shafarevich-Tate groups of elliptic curves over function fields (with Aaron Landesman and Eric Rains). *Math. Ann.* 387 (2023), no. 1-2, 615–687.
13. The Spectral Hecke Algebra. *Preprint*.
14. Étale Steenrod Operations and the Artin-Tate Pairing. *Compos. Math.* 156 (2020), no. 7, 1476–1515.
15. Nearby cycles of parahoric shtukas, and a fundamental lemma for base change. *Selecta Math. (N.S.)* 26 (2020), no. 2, Paper No. 21, 59 pp.
16. Epipelagic Langlands parameters and L-packets for unitary groups (with Niccolo Ronchetti and Cheng-Chiang Tsai). *Int. J. Number Theory* 16 (2020), no. 7, 1449–1491.
17. Extensions of vector bundles on the Fargues-Fontaine curve (with Chris Birkbeck, David Hansen, Serin Hong, Qirui Li, Anthony Wang, and Lynelle Ye). *J. Inst. Math. Jussieu*, 1-46.
18. Privately Evaluating Decision Trees and Random Forests (with Kristin Lauter, Michael Naehrig, and David Wu). *Proceedings on Privacy Enhancing Technologies* 2016 (4), 1-21.
19. Elliptic curves with full 2-torsion and maximal adelic Galois representations (with Z. Li, S. Trebat-Leder, D. Corwin). *Math. Comp.* 83 (2014), 2925-2951.
20. Three Selmer Groups for Elliptic Curves with 3-torsion (with K. James, C. Kim, E. Ramos, C. Trentacoste, H. Xue). *Ramanujan Journal* Volume 31, Issue 3 (2013), 435-459.
21. Birth-death Processes and  $q$ -Continued Fractions (with M. Wage, R. Kirsch, E. McCall). *Trans. Amer. Math. Soc.* 364 (2012), 2703-2721.

## INVITED TALKS

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### Conference Talks

- Relative Langlands Duality, Minnesota June 2024
- AIM Workshop “Arithmetic intersection theory on Shimura varieties”, Pasadena Jan 2024
- Arithmetic algebraic geometry (Rapoport 75), Münster Oct 2023
- Conference on Local Langlands, Bonn June 2023
- 4th Kyoto-Nanjing workshop on arithmetic and Geometry Nov 2022
- Maryland Algebra and Number Theory Day Nov 2022
- Arithmetic and topology around the Langlands program, Stockholm June 2022
- The 7th KTGU Mathematics Workshop for Young Researchers (online) Feb 2022
- Cohomology of Arithmetic Groups, Banff/online Oct 2021
- Workshop on Arithmetic Statistics Problems, online July 2021
- Workshop “Representation Theory and Geometry”, IAS/online Mar 2021
- AMS Special Session “Recent Developments in Automorphic Representations”, online Mar 2021
- AIM Workshop “Arithmetic intersection theory on Shimura varieties”, online Jan 2021
- AIM Workshop ‘Geometric realizations of Jacquet-Langlands correspondences’ Nov 2019
- Banff Workshop “Modularity and Moduli Spaces”, Oaxaca Oct 2019
- Eisenstein Ideal and Iwasawa Theory, Beijing June 2019
- Serre Conjectures and the  $p$ -adic Langlands program, Padova May 2019
- The Langlands Program: Endoscopy and Beyond, Singapore Dec 2018
- Junior Number Theory Days 2018, Rutgers-Newark Nov 2018
- AMS Special Session “Representations of reductive groups”, Ann Arbor Oct 2018

### Seminar Talks

· East China Normal University	Dec 28, 2023
· IAS/Princeton Arithmetic Geometry seminar	Dec 4, 2023
· USC Algebra seminar	Nov 13, 2023
· Yale Geometry, Symmetry, and Physics seminar	Oct 23, 2023
· Stanford Number Theory Seminar	Oct 9, 2023
· University of Wisconsin Number Theory Seminar	Feb 23, 2023
· Hong Kong Number Theory and Representation Theory Seminar	Nov 15, 2022
· Stanford Number Theory Seminar	Oct 10, 2022
· MIT Lie Groups Seminar	Nov 13 2021
· Harvard Number Theory Seminar	Nov 10 2021
· U Arizona Algebra & Number Theory Seminar	Oct 5 2021
· BC NT & AG Seminar	Sep 23 2021
· UMD Algebra–Number Theory Seminar	Sep 20 2021
· electronic Algebraic K-theory Seminar	April 27 2021
· UCSB Seminar on Geometry and Arithmetic	April 16 2021
· RAMPAGE seminar	Dec 10 2020
· ISTA Austria Number Theory seminar	Dec 3 2020
· Geometric Langlands Office Hours seminar	Dec 2 2020
· Rutgers Number Theory seminar	Dec 1 2020
· UCLA Number Theory seminar	Oct 19 2020
· Princeton/IAS Number Theory seminar	Sep 17 2020
· Michigan – Arithmetic Geometry Initiative – Columbia seminar	June 11 2020
· UCLA Number Theory Seminar	Mar 30 2020
· Michigan State University Number Theory Seminar	Feb 5 2020
· UWisconsin Number Theory Seminar	No. 21 2019
· UPenn Algebra Seminar	Oct 28 2019
· Harvard Number Theory Seminar	Sep 25 2019
· Yale Algebra and Number Theory Seminar	Sep 17 2019
· Columbia Automorphic Forms and Arithmetic Seminar	Sep 13 2019
· Duke Number Theory Seminar	Sep 6 2019
· Fudan University Number Theory Seminar	June 2019
· Tsinghua University Number Theory Seminar	June 24 2019
· UMD Number Theory Seminar	April 24 2019
· Johns Hopkins Number Theory Seminar	April 22 2019
· UW Number Theory Seminar	April 16 2019
· Stanford Number Theory Seminar	Jan 14 2019
· UChicago Number Theory/Topology Seminar	Oct 23 2018
· University of Michigan Groups, Lie, and Number Theory Seminar	Oct 22 2018
· Berkeley Arithmetic Geometry Seminar	Oct 8 2018
· MIT Number Theory Seminar	Sep 25 2018
· University of Utah Representation Theory and Number Theory Seminar	Sep 7 2018
· UGA Number Theory/Arithmetic Geometry Seminar	April 18 2018
· Princeton Diophantine Analysis Working Seminar	April 9 2018
· Columbia Automorphic Forms and Arithmetic Seminar	April 6 2018
· USC/UCLA Joint Algebra Seminar	Sep 19 2017
· USC Algebra Seminar	Sep 18 2017

## Lecture Series

- MSRI Introductory Workshop on Euler Systems,  $L$ -values, and Algebraic Cycles Jan 2023
- Derived aspects of the Langlands correspondence (joint with Michael Harris), IHES July 2022
- Towards a function field Kudla program, 30e Rencontres arithmétiques de Caen May 2022
- Lectures series on arithmetic groups (4 lectures), UChicago Oct. 2020

## AWARDS

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NSF Standard Grant DMS-2302520	2023-2026
NSF Postdoctoral Fellowship	2019-2022
Stanford Achievement Rewards for College Scientists (ARCS) Fellow	2018-2019
NSF Graduate Fellow	2014-2019
Churchill Fellowship	2013-2014

## SERVICE

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Colloquium Organizer, Fall 2022, Fall 2023 Berkeley  
DEI Committee, Fall 2022, Fall 2023 Berkeley

Organizer for: Young Researchers Network (July 2023), RTG Graduate Workshop (May 2023), Undergraduate Number Theory conference (April 2023)

Referee/Quick Opinion for: Annals of Math, Duke Math Journal, Inventiones Math, Journal of the AMS, Journal of the EMS, etc.

Problem Session Leader (virtual), Arizona Winter School 2022.

Directed Reading Program Mentor at MIT.

- Mentees: Preston Cranston, Carl Schildkraut

Directed Reading Program Mentor at Stanford.

- Mentees: Brian Morris, Nina Zubrilina.

Organizer of several local seminars: STAGE (MIT 2022, 2021), Geometrization of Local Langlands discussion group (IAS 2020), AFL working group (MIT 2019), Student AWS study group (Stanford 2018), Student Geometric Langlands (Stanford 2016), Student algebraic geometry (Stanford 2015).

Counselor for Program for in Mathematics for Young Scientists (2010, 2013).

## TEACHING EXPERIENCE

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Math 185: Introduction to complex analysis	Berkeley, 2022
18.03: Ordinary differential equations	MIT, 2022
18.784: Seminar in Number Theory	MIT, 2021

## WORK EXPERIENCE

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**Summer Intern**, Microsoft Research (Redmond) 2014

Worked on designing efficient algorithms involving homomorphic encryption; produced one paper (now published) and two patents (US9787647B2 and US9825758B2).