

# Wei-Lun Tsai

## Curriculum Vitae

Department of Mathematics, UofSC  
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## Employment

- 2023 – present **Tenure Track Assistant Professor**, *University of South Carolina*.
- 2020 – 2023 **Research Postdoctoral Fellow**, *University of Virginia*.  
Mentor: Professor [Ken Ono](#)
- August 2021 **Visiting Scientist**, *Max Planck Institute for Mathematics*.
- 2013 – 2014 **Research Assistant**, *Institute of Mathematics, Academia Sinica*.  
Mentor: Professor [Chia-Fu Yu](#)

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## Education

- 2015 – 2020 **Ph.D. in Mathematics**, *Texas A&M University*.  
Thesis Title: *The distribution of Fourier coefficients of weak Maass forms*  
Advisor: Professor [Riad Masri](#)  
GPA: 4.0/4.0
- 2007 – 2012 **B.S. & M.Sc. in Mathematics**, *National Taiwan University*.  
Advisor: Professor [Ki-Seng Tan](#)

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## Research Interests

Number Theory: automorphic and modular forms, elliptic curves,  $L$ -functions, number fields, and partitions.

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## Preprints (several more in preparation)

1. **On the nonvanishing of central values and derivatives of modular  $L$ -functions in families of quadratic twists**, (with A. Burungale and K. Ono), in preparation.
2. **Euler-type recurrences for  $t$ -color and  $t$ -regular partition functions**, (with T. Bhowmik and D. Ye), submitted for publication.
3. **Equidistribution of Fourier coefficients of half-integral weight Maass-Poincaré series**, (with R. Masri), submitted for publication.
4. **Malle's conjecture for  $G \times A$ , with  $G = S_3, S_4, S_5$** , (with R. Masri, F. Thorne, and J. Wang), submitted for publication.

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## Publications

1. **Do perfect powers repel partition numbers?**, (with M. Merca and K. Ono), *Annals of the Academy of Romanian Scientists*, in press.

2. **Lucas congruences using modular forms**, (with F. Beukers and D. Ye), *Bulletin of the London Mathematical Society*, in press.
3. **The modularity of Z.-W. Sun’s conjectural formulas for  $\frac{1}{\pi}$** , (with M. van Hoeij and D. Ye), *Proceedings of the American Mathematical Society*, in press.
4. **Local limit theorems for hook lengths in partitions**, (with T. Bhowmik), *Annals of Combinatorics*, in press.
5. **Distributions of hook lengths in integer partitions**, (with M.J. Griffin, and K. Ono), *Proceedings of the American Mathematical Society (Series B)*, **11**, 422–435 (2024).
6. **Corrigendum to Variants of Lehmer’s speculation for newforms**, (J.S. Balakrishnan, W. Craig, and K. Ono), *Advances in Mathematics*, **435**, Part A (2023).
7. **Limiting Betti distributions of Hilbert schemes on  $n$  points**, (with M.J. Griffin, K. Ono, and L. Rolén), *Canadian Mathematical Bulletin*, **66**, 243–258 (2023).
8. **AGM and jellyfish swarms of elliptic curves**, (with M.J. Griffin, K. Ono, and N. Saikia), *American Mathematical Monthly*, **130**, 355–369 (2023).
9. **Variants of Lehmer’s speculation for newforms**, (J.S. Balakrishnan, W. Craig, and K. Ono), *Advances in Mathematics*, **428**, 109–141 (2023).
10. **Equidistribution of Fourier coefficients of integral weight Maass-Poincaré series**, (with R. Masri), *Advances in Mathematics*, **409**, Part A (2022).
11. **Even values of Ramanujan’s tau-function**, (with J.S. Balakrishnan, and K. Ono), *La Matematica*, **1**, 394–403 (2022).
12. **Tamagawa products of elliptic curves over  $\mathbb{Q}$** , (with M.J. Griffin, and K. Ono), *Quarterly Journal of Mathematics* (Oxford), [Sir Michael Atiyah Memorial Issue] **72**, Issue 4, 1517–1543, (2021).
13. **Heights of points on elliptic curves over  $\mathbb{Q}$** , (with M.J. Griffin, and K. Ono), *Proceedings of the American Mathematical Society*, **149**, 5093–5100, (2021).
14. **The asymptotic distribution of traces of weak Maass forms**, (with N. Khaochim and R. Masri), *Mathematika*, **67**, 739–787 (2021).
15. **Quadratic twists of elliptic curves and class numbers**, (with M.J. Griffin, and K. Ono), *Journal of Number Theory*, **227**, 1–29 (2021).
16. **Stark units and special Gamma values**, (with A. Barquero-Sanchez and R. Masri), *Research in Number Theory*, **7**:38 (2021).
17. **Asymptotic distribution of the partition crank**, (with A. Hamakiotes and A. Kriegman), *The Ramanujan Journal*, **56**, 803–820 (2021).
18. **Effective bounds for traces of singular moduli**, (with H. Ellers, M. Kenney and R. Masri), *Journal of Number Theory*, **212**, 1–17 (2020).
19. **Nonvanishing of Hecke  $L$ -functions and Bloch-Kato  $p$ -Selmer groups**, (with A. Iannuzzi, B.D. Kim, R. Masri, A. Mathers and M. Ross), *Mathematical Research Letters*, **26**:4 (2019).
20. **An effective bound for the partition function**, (with N. Khaochim and R. Masri), *Research in Number Theory*, **5**:14 (2019).
21. **Squared envelope-based SNR estimation**, (with M.-J. Hao and Y.-C. Tsai), *Journal of the Chinese Institute of Engineers*, **36** (6), 810–818 (2013).

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## Awards and Grants

- 2024-2025 **Number Theory Meetings in the Southeast, NSF**, (Co-PI).  
2024-2025 **Number Theory Meetings in the Southeast, NSA**, (Co-PI).  
2023-2025 **AMS–Simons Travel Grant**, *AMS & Simons Foundation*.  
2015-2020 **Graduate Assistantship**, *Texas A&M University*.  
2015-2020 **Graduate Student Travel Grant**, *Texas A&M University*.  
2012 **Outstanding Teaching Assistant Award**, *National Taiwan University*.

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## Mentoring

- Summer 2023 **Mentor**, *Summer REU*, University of Virginia.  
Topic: *Arithmetic of Hecke L-functions and class number formulas*
- Summer 2022 **Mentor**, *Summer REU*, University of Virginia.  
Topic: *Distributions of hook lengths*
- Summer 2021 **Mentor**, *Summer REU*, University of Virginia.  
Topic: *Tamagawa products for elliptic curves over number fields*
- Summer 2020 **Mentor**, *Summer REU*, University of Virginia.  
Topic: *Variants of Lehmer's speculation*
- Summer 2019 **Graduate Student Mentor**, *Summer REU*, Texas A&M University.  
Topic: *Asymptotic distribution of the partition crank*
- Spring 2019 **Mentor**, *Directed Reading Program*, Texas A&M University.  
Topic: *The zeros of the Riemann zeta function*
- Fall 2018 **Mentor**, *Directed Reading Program*, Texas A&M University.  
Topic: *The distribution of prime numbers*
- Summer 2018 **Graduate Student Mentor**, *Summer REU*, Texas A&M University.  
Topic: *Effective bounds for traces of singular moduli*
- Summer 2017 **Graduate Student Mentor**, *Summer REU*, Texas A&M University.  
Topic: *Nonvanishing of Hecke L-functions*

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## PhD Students

Tapas Bhowmik, in progress at the University of South Carolina

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## Teaching Experience

- Fall 2024 **Instructor**, *Algebra I* (graduate), UofSC.
- Fall 2024 **Instructor**, *Calculus I*, UofSC.
- Spring 2024 **Instructor**, *Algebraic Number Theory* (graduate), UofSC.
- Fall 2023 **Instructor**, *Calculus I* (2 sections), UVA.
- Spring 2023 **Instructor**, *Survey of Algebra*, UVA.
- Spring 2023 **Instructor**, *Calculus III*, UVA.
- Fall 2022 **Instructor**, *Calculus III*, UVA.
- Summer 2022 **Instructor**, *A Survey of Calculus II*, UVA.
- Spring 2022 **Instructor**, *Commutative Algebra* (graduate), UVA.
- Fall 2021 **Instructor**, *Calculus III* (2 sections), UVA.

Spring 2021 **Instructor**, *Survey of Algebra*, UVA.  
 Spring 2021 **Recitation Instructor**, *Basic Real Analysis*, UVA.  
 Fall 2020 **Instructor**, *Calculus III*, UVA.  
 Fall 2020 **Recitation Instructor**, *Calculus III*, UVA.  
 Fall 2019 **Teaching Assistant**, *Engineering Mathematics I*, Texas A&M.  
 Fall 2018 **Instructor**, *Mathematical Concepts-Calculus*, Texas A&M.  
 Summer 2018 **Instructor**, *Qualifying Exam Prep-Complex Analysis* (graduate), Texas A&M.

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## Selected Talks

January 11, 2025 Joint Mathematics Meeting, AMS Special Session on  $L$ -functions, Automorphic Forms, and Their Applications.  
 June 13, 2024 Number Theory REU (2 talks), Clemson University.  
 April 19, 2024 Algebra, Discrete Math, Number Theory Seminar, Clemson University.  
 March 26, 2024 Number Theory Seminar, Vanderbilt University.  
 December 21, 2023 19th Annual International Conference on Srinivasa Ramanujan, SASTRA University (Plenary Speaker).  
 March 11, 2023 Southern Regional Number Theory Conference, Louisiana State University (Plenary Speaker).  
 February 13, 2023 Seminar on Research in Mathematics, University of Virginia.  
 January 4, 2023 Joint Mathematics Meeting, AMS Special Session on Modular Forms, Hypergeometric Functions, Character Sums and Galois Representations.  
 January 4, 2023 Joint Mathematics Meeting, AWM Special Session on Celebrating the Mathematical Contributions of the AWM.  
 December 7, 2022 Department Colloquium, University of South Carolina.  
 February 7, 2022 Number Theory Seminar, Boston University.  
 January 28, 2022 Number Theory Seminar, University of Cologne.  
 November 19, 2021 Number Theory Seminar, National Center for Theoretical Sciences-NCTS.  
 April 7, 2021 Number Theory Seminar, Vanderbilt University.  
 March 19, 2021 Number Theory Seminar, University of Virginia.  
 November 30, 2020 Number Theory Seminar, Washington State University.  
 March 14, 2020 AMS Special Session on Youth and Enthusiasm in Arithmetic Geometry and Number Theory, University of Virginia (canceled).  
 April 13, 2019 Southern Regional Number Theory Conference, Louisiana State University.  
 April 4, 2019 Number Theory Seminar, University of Wisconsin-Madison.  
 March 27, 2019 Number Theory Seminar, Texas A&M University.  
 June 1, 2018 CTNT 2018 Conference, University of Connecticut.  
 March 20, 2018 32th Automorphic Forms Workshop, Tufts University.  
 February 28, 2018 Number Theory Seminar, Texas A&M University.

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## Recent Conferences Attended

Spring 2025 Joint Mathematics Meeting, AMS Special Session on  $L$ -functions, Automorphic Forms, and Their Applications.

Fall 2024 Palmetto Number Theory Series XXXVIII (WFU)  
 Spring 2024 Nonlocal Models: Analysis and Applications (UofSC)  
 Fall 2023 19th Annual International Conference on Srinivasa Ramanujan  
 Fall 2023 Palmetto Number Theory Series XXXVII (UGA)  
 Fall 2023 Palmetto Number Theory Series XXXVI (Clemson)  
 Spring 2023 Arithmetic Geometry & Algebraic Groups (UVA)  
 Spring 2023 Southern Regional Number Theory Conference (LSU)  
 Spring 2023 Joint Mathematics Meeting, AWM Special Session on Celebrating the Mathematical Contributions of the AWM.  
 Spring 2023 Joint Mathematics Meeting, AMS Special Session on Modular Forms, Hypergeometric Functions, Character Sums and Galois Representations.  
 Fall 2022 POSTECH-PMI Joint Workshop on Number Theory  
 Fall 2020 AMS Fall Eastern Sectional Meeting (formerly at 2-Oct-20 Pennsylvania State University, University Park Campus)  
 Fall 2020 The Johns Hopkins Junior Number Theory Days  
 Fall 2020 Modularity of Quantum Systems, KITP  
 Spring 2019 Southern Regional Number Theory Conference (LSU)  
 Spring 2019 33th Automorphic Forms Workshop (Duquesne)  
 Summer 2018 Connecticut Summer School and Conference in Number Theory (UConn)

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## Referee Service (including quick opinions)

*Acta Arithmetica, Advances in Mathematics, Annales mathématiques du Québec*  
*Annals of Combinatorics, Archiv der Mathematik, Expositiones Mathematicae*  
*Houston Journal of Mathematics, INTEGERS*  
*International Journal of Number Theory*  
*Journal of Mathematical Analysis and Applications*  
*Proceedings of the American Mathematical Society*  
*Research in the Mathematical Sciences, Research in Number Theory*  
*Taiwanese Journal of Mathematics, The American Mathematical Monthly*  
*The Australasian Journal of Combinatorics, The Ramanujan Journal*