Jiuya Wang – Curriculum Vitae

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Department of Mathematics

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Employment

2018-present Phillip Griffiths Assistant Research Professor,
Department of Mathematics, Duke University

2018-2019 Foerster-Bernstein Postdoctoral Fellow,
Department of Mathematics, Duke University

Education

2013-2018 Ph.D. in Mathematics
Department of Mathematics, University of Wisconsin-Madison
Advisor: Prof. Melanie Matchett Wood

2009-2013 Bachelor in Mathematics
School of Mathematics and Computational Science, Sun Yat-sen University

Honors and Awards

2019 **AMS Simons Travel Grant**
travel funding for early-career mathematician with $ 2000 yearly for two years awarded by AMS from Simons Foundation

2019 **AWM Dissertation Prize**
an annual award for up to three outstanding Ph.D. dissertations presented by female mathematical scientists and defended in US

2018 **Foerster Bernstein Fellowship**
one year postdoctoral fellowship, awarded to 2 women researchers in STEM fields yearly at Duke University

2017 **Excellence in Mathematical Research Award**
for significant and substantial contributions to research in mathematics, awarded by Department of Mathematics of University of Wisconsin Madison to graduate students

2017 **Math Department TA Awards**
are given to students who have demonstrated excellence in the classroom, awarded by Department of Mathematics of University of Wisconsin Madison to graduate students

2017 **Elizabeth S. Hirschfelder Prize**
for an outstanding female student who has demonstrated promise in their academic work, awarded by Department of Mathematics of University of Wisconsin Madison to female graduate students

2012 **Xuerou Li Scholarship**
18 awarded yearly to top undergraduates in Sun Yat-sen University

2011 **National Outstanding Paper & National First Prize**
Contemporary Undergraduate Mathematical Contest in Modeling

2009 - 2012 **Outstanding Student Scholarship (four times)**
yearly awarded to top undergraduates in Sun Yat-sen University

2009 - 2012 **China National Scholarship (four times)**
highest scholarship awarded to top students in universities in China yearly

Research Interest

I am interested in number theory on both the algebraic side and the analytic side. I am now mainly working on arithmetic statistics. I am also interested in group theory, representation theory and algebraic geometry.

Publications

[9] Jiuya Wang, *Pointwise Bound for ℓ-torsion in Class Groups II: Nilpotent Extensions* , arXiv: 2004.11510, submitted for publication.

> *For every finite p-group G_p that is non-cyclic and non-quaternion and every positive integer $\ell \neq p$ that is greater than 2, we prove the first non-trivial bound on ℓ-torsion in class group of every G_p-extension. More generally, for every nilpotent group G where every Sylow-p subgroup $G_p \subset G$ is non-cyclic and non-quaternion, we prove a non-trivial bound on ℓ-torsion in class group of every G-extension for every integer $\ell > 1$. All results are unconditional and pointwise.*

[8] Yeuk Hay Joshua Lam, Yuan Liu, Romyar Sharifi, Preston Wake and Jiuya Wang, *Generalized Bockstein maps and Massey products* , arXiv: 2004.11510, submitted for publication .

> *Given a profinite group G of finite p-cohomological dimension and a pro-p quotient H of G by a closed normal subgroup N, we study the filtration on the cohomology of N by powers of the augmentation ideal in the group algebra of H. We show that the graded pieces are related to the cohomology of G via analogues of Bockstein maps for the powers of the augmentation ideal. For certain groups H, we relate the values of these generalized Bockstein maps to Massey products relative to a restricted class of defining systems depending on H. We apply our study to give a new proof of the vanishing of triple Massey products in Galois cohomology.*

[7] Riad Masri, Frank Thorne, Wei-Lun Tsai and Jiuya Wang, *Malle's Conjecture for $G \times A$ with $G = S_3, S_4, S_5$* , arXiv: 2004.04651, submitted for publication.

> *We prove Malle's conjecture for $G \times A$, with $G = S_3, S_4, S_5$ and A an abelian group. This builds upon work of the fourth author, who proved this result with restrictions on the primes dividing A.*

[6] Jürgen Klüners and Jiuya Wang, *ℓ-torsion bounds for the class group of number fields with an ℓ-group as Galois group*, arXiv: 2003.12161, submitted for publication.

> *We describe the relations among the ℓ-torsion conjecture for ℓ-extensions, the discriminant multiplicity conjecture for nilpotent extensions and a conjecture of Malle giving an upper bound for the number of nilpotent extensions. We then prove all of these conjectures in these cases.*

[5] Jiuya Wang, *Pointwise Bound for ℓ-torsion in Class Groups: Elementary Abelian Extensions*, arXiv: 2001.03077, **Journal für die reine und angewandte Mathematik**, DOI: https://doi.org/10.1515/crelle-2020-0034.

> *Elementary abelian groups are finite groups in the form of $A = (\mathbb{Z}/p\mathbb{Z})^r$ for a prime number p. For every integer $\ell > 1$ and $r > 1$, we prove a non-trivial upper bound on the ℓ-torsion in class groups of every A-extension. Our results are pointwise and unconditional. This establishes the first case where for some Galois group G, the ℓ-torsion in class groups are bounded non-trivially for every G-extension and every integer $\ell > 1$. When r is large enough, the unconditional pointwise bound we obtain also breaks the previously best known bound shown by Ellenberg-Venkatesh under GRH.*

[4] Robert J. Lemke Oliver, Jiuya Wang and Melanie Matchett Wood, *Inductive Methods for Proving Malle's Conjecture, Oberwolfach report preliminary_OWR_2018_34.*

> *We propose a general framework to inductively count number fields. By using this method, we prove the asymptotic distribution for extensions with Galois groups in the form of $T \wr B$ where $T = S_3$ or every abelian groups and B is an arbitrary group with the associated counting function not growing too fast.*

[3] Jiuya Wang, *Malle's Conjecture for $S_n \times A$ for $n = 3, 4, 5$*, arXiv: 1705.00044, accepted at **Compositio Mathematica**.

> *We propose a framework to prove Malle's conjecture for the compositum of two number fields based on proven results of Malle's conjecture and good uniformity estimates. Using this method we can prove Malle's conjecture for $S_n \times A$ over any number field k for $n = 3$ with A an abelian group of order relatively prime to 2, for $n = 4$ with A an abelian group of order relatively prime to 6 and for $n = 5$ with A an abelian group of order relatively prime to 30. As a consequence, we prove that Malle's conjecture is true for $C_3 \wr C_2$ in its S_9 representation, whereas its S_6 representation is the first counter example of Malle's conjecture given by Klüners.*

[2] Jiuya Wang, *Secondary Term of the Asymptotic Estimate of $S_3 \times A$ Extensions over $\mathbb{Q}$* , arXiv: 1710.10693, submitted for publication.

> *We combine a sieve method together with good uniformity estimates to prove a secondary term for the asymptotic estimate of $S_3 \times A$ extensions over $\mathbb{Q}$ when A is an odd abelian group with minimal prime divisor greater than 5. At the same time, we prove the existence of a power saving error when A is any odd abelian group.*

[1] Nigel Boston and Jiuya Wang, *The 2-Class Tower of $\mathbb{Q}(\sqrt{-5460})$* , arXiv: 1710.10681, **Geometry, Algebra, Number Theory, and Their Information Technology**, Toronto, Canada, June 2016 and Kozhikode, India, August 2016.

> *The seminal papers in the field of root-discriminant bounds are those of Odlyzko and Martinet. Both papers include the question of whether the field $\mathbb{Q}(\sqrt{-5460})$ has finite or infinite 2-class tower. This is a critical case that will either substantially lower the best known upper bound for lim inf of root-discriminants (if infinite) or else give a counterexample to what is often termed Martinet's conjecture or question (if finite). Using extensive computation and introducing some new techniques, we give strong evidence that the tower is in fact finite, establishing other properties of its Galois group en route.*

Invited Talks

2020 Nov	Number Theory Seminar, MIT, online seminar
2020 Sept	Number Theory Seminar, Harvard University, online seminar
2020 July	MAGIC: Michigan - Arithmetic Geometry Initiative - Columbia, online seminar
2020 June	Canadian Math Meeting, Ottawa, ON (postponed)
2019 Dec	PANTS, Clemson University, Columbus, SC
2019 Dec	Number Theory Seminar, University of Waterloo, Waterloo, ON
2019 Dec	Canadian Math Meeting, Toronto, ON
2019 Nov	Number Theory Seminar, John Hopkins University, Baltimore, MD
2019 Nov	Number Theory Seminar, University of South Carolina, Columbus, SC
2019 June	Max Planck Institute, Bonn, Germany
2019 April	AWM Research Symposium, Houston, TX
2019 March	Hawaii Number Theory Conference, Hawaii
2019 Feb	Number Theory Seminar, University of Toronto, ON, Canada
2019 Jan	Joint Math Meetings 2019, Baltimore, MD
2018 Nov	Number Theory Seminar, Duke University, Durham, NC
2018 Oct	Number Theory Seminar, Emory University, Atlanta, GA
2018 July	Explicit Methods in Number Theory, Oberwolfach, Germany
2018 April	AMS meeting, Northeastern University, Boston, MA

2018 Feb	Number Theory Seminar, Tufts University, Boston, MA
2017 Nov	Number Theory Seminar, University of Washington, Seattle, WA

Conferences

2021 June	Canadian Math Meeting, Ottawa, ON, Canada
2021 Feb	Arithmetic statistics, discrete restriction, and Fourier analysis, AIM workshop
2020 July	Local-Global Principles and Arithmetic Statistics, Vienna, Austria (postponed)
2020 May	Simons Symposium on Geometry of Arithmetic Statistics, Krün, Germany
2019 Dec	PANTS, Clemson University, Columbus, SC
2019 Dec	Canadian Math Meeting, Toronto, ON, Canada
2019 June	Max Planck Institute, Bonn, Germany
2019 April	AWM Research Symposium, Houston, TX
2019 March	Hawaii Number Theory Conference, Hawaii
2019 Feb	Geometry and Arithmetic of Surfaces Workshop, Madison, WI
2019 Jan	Joint Math Meetings 2019, Baltimore, MD
2018 Sept	Open Questions in Cryptography and Number Theory, Irvine, CA
2018 July	Explicit Methods in Number Theory, Oberwolfach, Germany
2018 July	CNTA, Quebec city, Quebec, Canada
2018 June	Hausdorff School on L-Functions, Bonn University, Bonn, Germany
2018 June	Mazur's birthday conference, Harvard University, Boston, MA
2018 May	Probability in Number Theory, Unversity de Montreal, Montreal, Quebec, Canada
2018 May	Strength in Numbers, Queens University, Kingston, Ontario, Canada
2018 April	Eighth Upstate Number Theory Conference, Unibersity at Buffalo, Buffalo, NY
2018 April	AMS Special Session Meeting, Northeastern Univeristy, Boston, MA
2018 Feb	Graduate Workshop in Algebraic Geometry, Boston, MA
2017 June	Reboot II, Duke University, Durham, NC
2017 May	Recent Development in Analytic Number Theory, MSRI, Berkeley, CA
2017 Mar	Arizona Winter School, University of Arizona, Tucson, AZ
2016 Nov	2016 Fields Medal Symposium, The Fields Institute, Toronto, ON, Canada
2016 Jun	L-functions and Arithmetic: in honor of the 60th Birthday of Karl Rubin, Harvard University, Boston, MA
2016 Mar	Arizona Winter School, University of Arizona, Tucson, AZ
2015 Mar	Arizona Winter School, University of Arizona, Tucson, AZ

Teaching

2021 Spring	Math 401: Abstract Algebra
2020 Fall	Math 212: Multi-variable Calculus
2020 Spring	Math 401: Abstract Algebra
2017 Spring	Math 234: Multi-variable Calculus (Evaluation Superior)
2016 Fall	Math 234: Multi-variable Calculus
2015 Summer	Math 211: Business Calculus

2015 Spring	Math 234: Multi-variable Calculus
2014 Fall	Math 211: Business Calculus
2014 Spring	Math 171: Calculus 1
2013 Fall	Math 222: Calculus 2

Activity

2021 Summer	course instructor for SWIM (Summer Workshop in Mathematics for female high school students), Duke University *Randomness in Integers* (postponed from 2020 Summer)
2020 Summer	coleader for DoMath with Samit Dasgupta (Undergrad Research Program at Duke University), Duke University *Representation Theory with Applications in Statistics of Class Groups*
2019 Fall	organizer/main speaker for reading seminar, Duke University *Cohomology of Number Fields*
2019 Spring	coorganizer for a special session in 2019 Joint Math Meetings with Lillian Pierce and Arindam Roy, Baltimore, MD *Counting Methods in Number Theory*