Taylor Dupuy, PhD

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Appointments

Assistant Professor	University of Vermont	2022 –
Graduate Program Director	University of Vermont	2021
Assistant Professor	University of Vermont	2018–2021
Visiting Assistant Professor	University of Vermont	2016–2018
Postdoctoral Fellow	The Hebrew University	2014–2016
Postdoctoral Fellow	Mathematical Sciences Research Institute	2014
Adjunct Assistant Professor	UCLA	2013–2014

Education

University of Tulsa	Mathematics	2003–2004
University of Arizona, BS	Mathematics	2004–2007
University of New Mexico, PhD	Mathematics	2007–2013

Research Activities

Publications

1. Taylor Dupuy, Kiran S Kedlaya, and David Zureick-Brown. Angle ranks of abelian varieties. *Mathematische Annalen*, pages 1–17, 2023

2. Taylor Dupuy, Kiran Kedlaya, David Roe, and Christelle Vincent. *Isogeny Classes of Abelian Varieties over Finite Fields in the LMFDB*. Simons Symposia. Springer, 2022

3. Taylor Dupuy, Kiran Kedlaya, David Roe, and Christelle Vincent. Counterexamples to a Conjecture of Ahmadi and Shparlinski. *Experimental Mathematics*, pages 1–5, 2021

4. Taylor Dupuy and David Zureick-Brown. Deligne-Illusie classes as arithmetic Kodaira-Spencer classes. *J. Théor. Nombres Bordeaux*, 31(2):371–383, 2019

5. Taylor Dupuy, Eric Katz, Joseph Rabinoff, and David Zureick-Brown. Total p-differentials on schemes over $\mathbf{Z}/p^2$. *J. Algebra*, 524:110–123, 2019

6. Taylor Dupuy. Examples of geometric Bombieri-Lang-Noguchi outside Mordell-Lang: nonrigid varieties with ample but not globally generated cotangent bundle. *J. Number Theory*, 175:158–166, 2017

7. Alexandru Buium and Taylor Dupuy. Arithmetic differential equations on GL_n, III Galois groups. *Selecta Math. (N.S.)*, 22(2):529–552, 2016

8. Alexandru Buium and Taylor Dupuy. Arithmetic differential equations on GL_n, II: arithmetic Lie-Cartan theory. *Selecta Math. (N.S.)*, 22(2):447–528, 2016

9. Alexandru Buium and Taylor Dupuy. Arithmetic differential equations on GL_n, I: Differential cocycles. *J. Algebra*, 454:273–291, 2016

10. Taylor Dupuy and David E. Weirich. Bits of 3^n in binary, Wieferich primes and a conjecture of Erdos. *J. Number Theory*, 158:268–280, 2016

11. Taylor Dupuy. Positivity and lifts of the Frobenius. *Math. Res. Lett.*, 21(2):289–295, 2014

12. Taylor Dupuy. *Arithmetic Deformation Theory*. ProQuest LLC, Ann Arbor, MI, 2013. Thesis (Ph.D.)–The University of New Mexico

Preprints

13. Taylor Dupuy and Ehud Hrushovski. The theory of the entire algebraic functions. *arXiv preprint arXiv:2305.12226*, 2023

14. Taylor Dupuy and Anton Hilado. Probabilistic Szpiro, Baby Szpiro, and Explicit Szpiro from Mochizuki's Corollary 3.12. *arXiv:2004.13108*, 2020

15. Taylor Dupuy and Anton Hilado. The Statement of Mochizuki's Corollary 3.12, Initial Theta data, and the First Two Indeterminacies. *arXiv:2004.13228*, 2020

16. Taylor Dupuy and Joe Rabinoff. A rigid analytic proof that the Abel-Jacobi map extends to compact-type models. *arXiv:1705.03034*, 2017

17. Taylor Dupuy, James Freitag, and Aaron Royer. Order one differential equations on nonisotrivial algebraic curves. *arXiv:1707.08714*, 2017

Honors and Awards

1. *"Witt vectors, deformations, and absolute geometry"* (DMS-1802012, $39938), PI, 2018
2. *"Arithmetic and algebraic differentiation: Witt vectors, number theory, and differential algebra"* (DMS-1502219), organizer on conference grant, Fall 2015
3. MSRI Postdoctoral Fellow (DMS-0932078), Spring 2014
4. New Mexico MCTP Summer Award (DMS-1148801), Summer 2013
5. New Mexico Efroymson Summer Award, Summer 2013
6. New Mexico MCTP Summer Award (DMS-1148801), Summer 2012

Selected Invited Talks[1]

1. *In Introduction to The p-Adic Numbers*, Young Scholar's Program, University of Illinois Chicago, Summer 2023

2. *The Theory of the Integers In $\mathbb{C}(t)^{alg}$ Interprets $\mathbb{Z}$*, Berkeley Model Theory Seminar, Spring 2023

3. *Some Computational Facts About Abelian Varieties For Nonspecialists*, Colloquium, TIMC, Fall 2022

4. *Angle Ranks of Abelian Varieties over Finite Fields*, Algebra Seminar, Carleton, Fall 2022

5. *Algebraic Relations Between Solutions of Order One Differential Equations on Curves*, Algebra Seminar, Emory, Summer 2022

6. *What Are the p-Adic Numbers?*, Young Scholar's Program, University of Illinois Chicago, Summer 2022

7. Panelist: *"Red Card to Green Light: How to be a Responsible Referee."*, Lunch in The Time of COVID, online, Spring 2022

8. *What is the ABC Conjecture?*, Mathematics and Statistics Colloquium, University of Vermont, Spring 2022

9. *Abelian Varieties in the LMFDB*, Geometry Seminar, University of New Mexico, Fall 2021

10. *Angle Ranks of Abelian Varieties over Finite Fields*, The 3rd Kyoto-Hefei Workshop on Arithmetic Geometry, Kyoto University, Fall 2021

11. *What is this? Have you seen this thing?*, Algebra and Number Theory Seminar, Dartmouth College, Spring 2021

[1] for a complete list visit `http://tdupu.github.io`

12. *New and Old Results in Wittferential Algebraic Geometry*, AMS Special Session on Branching Out: Ramification Invariants in Algebra and Geometry, Spring 2021

13. *Isogeny Class of Abelian Varieties in the LMFDB*, Stanford Algebraic Geometry Seminar, Stanford, Fall 2020

14. *The Meaning of Mochizuki's Inequality*, Geometry and Number Theory Seminar, University of Leiden, Fall 2020

15. *Sphere Packings in Hyperbolic Space*, Africa Math Seminar, Fall 2020

16. *Isogeny Classes of Abelian Varieties in the LMFDB*, Number Theory Seminar, Dartmouth College, Spring 2020

17. *How to work with Mochizuki's Inequality* (two parts), Algebraic Geometry and Number Theory Seminar, University of Arizona, Fall 2019

18. *Isogeny Classes of Abelian Varieties over Finite Fields*, Number Theory Seminar, Arizona State University, Fall 2019

19. *A Guide of Isogeny Classes in the LMFDB*, LMFDB as a Telescope, American Institute of Mathematics, Fall 2019

20. *Barrett Lectures A User's Guide to Mochizuki's Inequality*, Barrett Lectures (Plenary Speaker), University of Tennesse Knoxville, Spring 2019

21. *Explicit Computations in IUT*, AGNT Seminar, Rice, Spring 2019

22. *Deligne Modules*, ICERM, Abelian Varieties over Finite Fields Workshop, Spring 2019

23. *The Wittfinitesimal Torelli Problem*, Tufts, Algebra Seminar, Fall 2018

24. *Mochizuki's Inequalities*, University of Connecticut, CTNT, Summer 2018

25. *Deligne-Illusie Classes as Arithmetic Kodaira-Spencer Classes*, Number Theory Seminar, Boston College, Fall 2017

26. *The Theory of* $\mathbf{C}[t]^{alg}$ *interprets* $\mathbf{Z}$, Number Theory Seminar, University of Virginia, Fall 2017

27. *Indeterminacies in IUT*, Automorphic Forms Seminar, Purdue University, Spring 2017

28. *The Wittfinitesimal Torelli Problem*, Number Theory Seminar, University of Rochester, Spring 2017

29. *Deforming Derivatives*, Differential Algebra Special Session, AMS Eastern Sectional Meeting, Spring 2017

30. *The Wittfinitesimal Torelli Problem*, QVNTS, McGill University, Spring 2017

31. *The Theory of* $\mathbf{C}[t]^{alg}$ *interprets* $\mathbf{Z}$, Number Theory Seminar, Harvard University, Spring 2017

32. *Arithmetic Kodaira Spencer Classes in the Sense of Buium*, DART 7, City University of New York, Fall 2016

33. *Introduction to IUT2*, IUT Summit, RIMS Kyoto,Summer 2016.

34. *Multiradiality*, IUT Summit, RIMS Kyoto,Summer 2016.

35. *Some Constructions Used in Mochizuki's IUT*, Number Theory Seminar, University of Copenhagen, Spring 2016

36. *Kolchin Irreducibility*, Algebra Seminar, Emory University, Spring 2016

37. *Effective Bounds for Manin-Mumford for Certain Bad Reduction Curves* (with E. Katz, J. Rabinoff and D. Zureick-Brown), Kolchin Seminar Workshop, Spring 2016

38. *Toward Mazur's Conjecture on Uniform Manin-Mumford* (with E. Katz, J. Rabinoff and D. Zureick-Brown), Linfoot Seminar, Bristol University, Spring 2016

39. *Examples of Lang-Bombieri-Noguchi outside of Mordell-Lang.* (with D. Litt), Quebec Maine Number Theory Seminar, Maine University, Fall 2015

40. *Strongly Minimal Sets in DCF0*, Logic and Set Theoretic Topology Seminar, Ben Gurion University, Summer 2015 (with J. Freitag and A. Royer)

41. *Examples of Lang-Bombieri-Noguchi Outside of Mordell-Lang*, Séminaire de Géométrie Algébrique, Champs et Homotopie, Toulouse University, Spring 2015

42. *Derived Categories Meets Differential Algebra*, Model Theory and Applications Special Session, AMS-MAA Joint Mathematics Meetings 2015

43. *The Wittfinitesimal Torelli Problem* (3 parts), Model Theory Seminar, The Hebrew University, Fall 2014

44. *Kolchin Irreducibility* (with J. Freitag and L. E. Miller), Québec-Maine Number Theory Conference, Fall 2014

45. *Jet Spaces and Diophantine Geometry*, Kolchin Seminar, CUNY, Spring 2014

46. *Arithmetic Picard-Vessiot Theory* (with A. Buium), Differential Galois Theory Special Session, Spring Central Sectional Meeting of the AMS 2014

47. *Arithmetic Kolchin Irreducibility* (with J. Freitag and L. E. Miller), Arithmetic and Differential Algebraic Special Session, Spring Western Sectional Meeting of the AMS 2014

48. *Arithmetic Kolchin Irreducibility* (with J. Freitag and L. E. Miller), UC–Berkeley Model Theory Seminar, Spring 2014

49. *The Meaning of "Linearity" in Arithmetic Differential Equations*, UC–San Diego Number Theory Seminar, Fall 2013

50. *Arithmetic Kodaira-Spencer Classes*, Séminaire d'Arithmétique et Géométrie Algébrique, University of Strasbourg, Fall 2013

51. *Absolute Geometry and Arithmetic Kodaira-Spencer Classes*, UCLA Number Theory Seminar, Fall 2013

52. *Linear Wittferential Equations*, (with A. Buium), Model Theory Seminar, UC–Berkeley, Spring 2013

Other Academic Products

1. YouTube: 261K views, 14K hours viewed, 3.5K subscribers

   `https://www.youtube.com/channel/UCHWnZ1NtJ4WvE5AHmNVXziw/`

2. LMFDB contributor: database of isogeny classes of abelian varieties over finite fields.[2]

   `http://lmfdb.xyz/Variety/Abelian/Fq/`

3. `Sage` contributor.

   `https://www.sagemath.org/`

[2]Isomorphism classes is in progress with Stefano Marseglia, Edgar Costa, and David Roe

Organization of Conferences/Meetings/Workshops

1. co-organizer, "Arithmetic Geometry", Western Sectional Meeting of the AMS, October 2021
2. Shepard (co-organizer), AGITTOC (Algebraic Geometry in The Time of COVID), Algebraic Geometry Lecture Series, Summer 2020
3. co-organizer, Abelian Varieties in the LMFDB. Funded by the University of Vermont CEMS PRSE. March 2019
4. PI, "Witt Vectors, Deformations, and Absolute Geometry", Burlington, VT, July 2018 (DMS-1802012)
5. co-organizer, "Sage Days 87: p-adics and LMFDB',' Burlington, July 2017
6. co-organizer, "Kummer Classes and Anabelian Geometry", (DMS-1519977 — From Arithmetic Statistics to Zeta Elements II), Burlington, September 2016
7. co-organizer, "Algebraic Theory of Differential and Functional Equations," AMS-MAA Joint Mathematics Meetings, Atlanta, January 2016
8. co-organizer, "Arithmetic and Algebraic Differentiation," (DMS-1502219), `https://math.berkeley.edu/~scanlon/aad15.html`, Berkeley, May 2015
9. co-organizer, "Arithmetic and Differential Algebraic Geometry", Western Sectional Meeting of the AMS, Albuquerque, Spring, January 2014
10. co-organizer, "Witt Vectors Lifting and Descent," AMS-MAA Joint Mathematics Meetings, San Diego, January 2013

University and Professional Service

Seminars and Other Departmental Activities

1. Major advising (UVM): Fall 2018 –
2. Algebra Qualifying Exam Committee (UVM): Fall 2018 – Spring 2023
3. Colloquium Committee Chair (UVM): Fall 2022 –
4. Hiring Committee (UVM): Member, Spring 2020
5. Graduate Committee (UVM): Member Fall 2017–Spring 2020; Associate Chair Fall 2020 – Spring 2021, Graduate Program Director Fall 2021, Member Spring 2022 –
6. Graduate Admissions (UVM): Spring 2017–Spring 2022
7. unQVNTS (Algebra and Number Theory) Seminar (UVM): Organizer 2016–
8. Algebraic Geometry Learning Seminar (UVM): Organizer 2018–2021
9. Putnam Competition Committee (UVM): Chair Fall 2019– Spring 2020; member Fall 2020– Spring 2021
10. Undergraduate Curriculum Committee (UVM): Fall 2016–Spring 2017
11. Special Curricular Activities (UVM): proposed and executed changes to the qualifying exams and first year sequence in 2020.
12. Mathematics Library Committee: Chair Fall 2019 – Spring 2020

Editorial and Review Activities

Journal Refereeing: *Algebra and Number Theory*, *International Journal of Number Theory*, *Journal of Number Theory*, *Math Reviews*, *Journal für die reine und angewandte Mathematik (Crelle's Journal)*, *Journal of Commutative Algebra*, *International Mathematics Research Notices*, *Manuscripta Mathematica*,

Advising/Mentoring

1. PhD theses: Anton Hilado 2018–, Jesse Franklin 2019–
2. Undergraduate Research Advisee: Veronika Potter 2020 – 2022
3. Undergraduate Academic Advising (UVM): 2018–
4. Graduate Academic Advising (UVM): 2018–
5. AGITTOC (Algebraic Geometry in the Time of COVID) Shepherd: 2020 – ; I help manage and organizer a learning seminar which at peak viewing had near 2000 concurrent viewers. The principal organizer for this is Ravi Vakil at Stanford.

   `https://www.youtube.com/channel/UCy3u23mZE4TyW88yr6JLx9A`

6. Arizona Winter School: problem session leader (Colliot-Thélène group), 2015

References

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