

# James Freitag

504 SEO  
University of Illinois at Chicago  
☎ 217.415.5531  
✉ freitagj@gmail.com  
🌐 <http://www.math.uic.edu/freitag>

## Education

- 2007-2012 **Ph.D., Mathematics**, *University of Illinois at Chicago.*
- 2005-2007 **MS, Industrial Mathematics**, *Michigan State University.*
- 2002-2005 **BS, Mathematics and Economics with High Distinction**, *University of Illinois at Urbana-Champaign, Urbana, IL.*

## Experience

- 2021-present **Associate Professor**, *Department of Mathematics, Statistics, and Computer Science. Univeristy of Illinois at Chicago.*
- 2018-2021 **Assistant Professor**, *Department of Mathematics, Statistics, and Computer Science. Univeristy of Illinois at Chicago.*
- 2016-2018 **Research Assistant Professor**, *Department of Mathematics, Statistics, and Computer Science. University of Illinois at Chicago.*
- 2015-2016 **Assistant Adjunct Professor**, *Department of Mathematics. University of California, Los Angeles.*
- 2012-2015 **National Science Foundation Mathematical Sciences Postdoctoral Fellowship**, *University of California, Berkeley.*

## Research Grants

- 2020-2024 **National Science Foundation CAREER Grant, No. 1945251**, *Applied Model Theory*, \$420,000.
- 2017-2020 **National Science Foundation Grant, No. 1700095**, *Model Theory and Differential Equations*, \$147,108.
- 2018 **National Science Foundation Grant, No. 1834578**, *Pure and Applied Model Theory*, \$30,000.
- 2012-2015 **Mathematical Sciences Postdoctoral Fellowship**, *National Science Foundation*. \$150,000.

## Publications

Preprints available at [www.math.uic.edu/~freitag](http://www.math.uic.edu/~freitag).

**James Freitag, Rémi Jaoui and Rahim Moosa**, *When any three solutions are independent. Inventiones Mathematicae. 2022.*

**James Freitag and Rahim Moosa**, *Bounding nonminimality and a conjecture of Borovik-Cherlin. Accepted, Journal of the European Mathematical Society.*

**Guy Casale, James Freitag, Joel Nagloo**, *Ax-Lindemann-Weierstrass with derivatives and the genus 0 Fuchsian groups. Annals of Mathematics. 192.3 (2020): 721-765.*

**Hunter Chase and James Freitag**, *Bounds in query learning*. COLT 2020 <http://learningtheory.org/colt2020>.

**David Blazquez-Sanz, Guy Casale, James Freitag, Joel Nagloo**, *Some functional transcendence results around the Schwarzian differential equation*. *Annales de la Faculté des Sciences de Toulouse: Mathématiques. Serie 6, Volume 29 (2020) no. 5*, pp. 1265-1300.

**James Freitag, Omar Leon Sanchez, Wei Li**, *Effective definability of Kolchin polynomials*, *Proc. Amer. Math. Soc.* 148 (2020), 1455-1466.

**Hunter Chase and James Freitag**, *Model theory and Machine Learning*. *Bulletin of Symbolic Logic* 25.3 (2019): 319-332.

**Hunter Chase and James Freitag**, *Model theory and Combinatorics of Banned Sequences*. *Journal of Symbolic Logic*, 1-19, 2018.

**James Freitag and Rahim Moosa**, *Finiteness theorems on hypersurfaces in partial differential-algebraic geometry*, *Advances in Mathematics*, 314, 726-755, 2017.

**James Freitag**, *Bertini theorems for differential algebraic geometry*. *Proceedings of the AMS*, 2019 <https://doi.org/10.1090/proc/13588>.

**James Freitag, Wei Li, and Thomas Scanlon**, *Differential Chow Varieties Exist*. *Journal of the London Mathematical Society*, 95.1 (2017): 128-156.

**James Freitag and Wei Li**, *Simple extensions and effective bounds*. *Lecture notes in Computer Science*, 2015, 343-357.

**James Freitag and Omar León Sanchez**, *Uniform bounding in partial differential fields*. *Advances in Mathematics*, 288, 308-336, 2016.

**James Freitag and Andre Minchenko**, *Superstability and central extensions of algebraic groups*. *Advances in Applied Mathematics*, 72, 215-230, 2016.

**James Freitag and Thomas Scanlon**, *Strong minimality and the  $j$ -function*. *Journal of the European Mathematical Society* 20.1 (2017): 119-136.

**James Freitag, Omar León Sanchez and William Simmons**, *Linear dependence and completeness for differential algebraic varieties*. *Communications in Algebra*, 44.6, 2645-2669, 2016.

**James Freitag**, *Indecomposability for differential algebraic groups*. *Journal of Pure and Applied Algebra*, 219, 3009-3029, 2015.

**James Freitag**, *Completeness in partial differential algebraic geometry*. *Journal of Algebra*, 420(0):350-372, 2014.

**James Freitag**, *Isogeny in superstable groups*. *Archive for Mathematical Logic*, 53(3-4):449 - 461, 2014.

---

## Short-term appointments and programs

Summer 2022 **Member at Mathematical Sciences Research Institute, Berkeley, CA.**

Fall 2021 **Member at Fields Institute, Toronto, CA.**

Summer 2021-present **Structured Quartet Research Ensembles, American Institute of Mathematics, San Jose, CA.**

Fall 2020 **Member at Mathematical Sciences Research Institute, Berkeley, CA.**

- Summer 2019 **Summer Collaborators Program at the Institute for Advanced Studies, Princeton, NJ.**
- Spring 2014 **Postdoc at Mathematical Sciences Research Institute, Berkeley, CA.**
- Spring 2012 **Mathematical Research Communities Collaboration Grant**, *American Mathematical Society*, Collaboration with Rahim Moosa, University of Waterloo and Carol Wood, Wesleyan University.  
\$1500.
- Summer 2014 **AMS ICM Travel Grant**, *American Mathematical Society*.  
\$3800.
- Summer 2015 **SIAM ICIAM Travel Grant**, *American Mathematical Society*.  
\$2500.

### Invited colloquium or plenary talks

- Summer 2022 **Lecturer, Mathematical Sciences Research Institute Graduate Summer School, Berkeley, CA**, Algebraic Theory of Differential and Difference Equations, Model Theory and their Applications.
- Spring 2022 **Iowa Colloquium on Information, Complexity, and Logic**, *Iowa State University*, Model Theory and Learning Theory.
- Spring 2022 **Géométrie et Théorie des Modèles**, *Paris*, Not Pfaffian.
- Spring 2020 **DART X Conference**, *City University of New York and New York University*, Strong minimality for Painleve equations and Fuchsian equations.
- Spring 2020 **Math Department Colloquium**, *McMaster University*, Model Theory and Automorphic Functions.
- Fall 2019 **Math Department Colloquium**, *University of Waterloo*, Model Theory and Fuchsian Functions.
- Fall 2019 **Invited one hour talk**, *Dagstuhl*, Model theory and query learning.
- Summer 2019 **Applied Computer Algebra**, *Montreal, CA*, Lascar rank in differential fields.
- Summer 2018 **Model-Theoretic Methods in Number Theory and Algebraic Differential Equations**, *University of Manchester*, Fuchsian differential equations.
- Fall 2017 **Department Colloquium**, *Wesleyan University*, Algebraic relations between solutions of Painleve equations.
- Summer 2017 **Differential algebra and related topics**, *Linz, Austria*, Algebraic relations between Painleve transcendents.
- Fall 2016 **Differential algebra and related topics**, *City University of New York*, Ranks in differential fields.
- Spring 2016 **ASL invited address**, *ASL Winter meeting at the Joint Mathematics Meetings*, Differential algebra and special points conjectures.
- Summer 2015 **Differential Algebraic and Related Topics 6**, *8th International Congress on Industrial and Applied Mathematics*, Beijing, China, Uniform bounds in differential algebraic geometry.

- Fall 2013 **Logic Colloquium**, *University of California Berkeley*, Differential Algebraic Groups.
- Fall 2012 **Logic Colloquium**, *University of California, Los Angeles*, Almost simple differential algebraic groups.

————— Invited seminar and workshop talks

- Spring 2022 **Seminario Flotante**, *Universidad de los Andes*, Not Pfaffian.
- Spring 2022 **AMS Central sectional meeting**, *Purdue*, Not Pfaffian.
- Spring 2022 **Kolchin Seminar**, *New York*, Not Pfaffian.
  - Fall 2021 **Banff Workshop**, *Banff*, Generic differential equations.
  - Fall 2021 **Model Theory Seminar**, *Fields Institute*, Not Pfaffian.
  - Fall 2021 **Model Theory Seminar**, *University of Manchester*, Strong minimality and automorphic functions.
- Fall 2020 **MSRI model theory seminar**, *Berkeley*, Strong minimality of automorphic functions.
- Spring 2020 **Model Theory Seminar**, *MacMaster University*, Model Theory and Machine Learning.
  - Fall 2019 **AMS Sectional Meeting**, *Madison, WI*, Bounds in Query Learning.
- Spring 2019 **ASL North American Meeting**, *Association of Symbolic Logic*, Bounds in query learning.
- Spring 2019 **Logic Seminar**, *University of Notre Dame*, Bounds in query learning.
- Spring 2019 **Workshop on Model Theory, Differential/Difference Algebra, and Applications**, *City University of New York*, Strongly minimal sets in DCF.
  - Fall 2018 **Logic Seminar**, *City University of New York*, Model Theory and Learning Theory.
- Spring 2018 **ASL North American Meeting**, *Association of Symbolic Logic*, Model Theory and Learning Theory.
  - Fall 2017 **CMS Winter Meeting**, *Canadian Mathematical Society*, Finiteness principles for differential algebra.
  - Fall 2017 **Southern Wisconsin Logic Colloquium**, *University of Wisconsin*, Model Theory and the combinatorics of banned sequences.
- Summer 2017 **Field's institute workshop**, *Toronto*, Order one differential equations.
- Spring 2017 **AMS sectional meeting**, *CUNY*, Algebraic solutions between solutions of Painleve equations.
- Spring 2016 **AMS special session on Algebraic theory of differential and functional equations**, *Joint Mathematics Meetings*, Around Jouanolou-type theorems.
  - Fall 2015 **Logic in Southern California**, *Irvine, CA*, The finite cover property.
  - Fall 2015 **AMS sectional meeting**, *Chicago, IL*, Model theory special session, Around Jouanolou-type theorems.
- Spring 2015 **Model Theory, Difference/Differential Equations and Applications**, *Centre International de Rencontres Mathématiques, Luminy*, Differential algebra and special points conjectures.
- Spring 2015 **AMS Special Session on Model Theory and Applications**, *2014 Joint Mathematics Meetings*, Unlikely intersections and differential algebra.

- Fall 2014 **Southern Wisconsin Logic Colloquium**, *University of Wisconsin*, Isogeny classes of elliptic curves and differential equations.
- Fall 2014 **Model theory special session**, *2014 Canadian Mathematical Society Winter Meeting*, Varieties and isogeny classes of elliptic curves.
- Fall 2014 **Logic Seminar**, *University of Illinois at Chicago*, Intersections of isogeny classes and varieties.
- Fall 2014 **Logic Seminar**, *City University of New York*, Effective Bounds For Finite Differential-Algebraic Varieties (Part I).
- Summer 2014 **Applications of Computer Algebra**, *Fordham University*, Uniform bounds for finite differential algebraic varieties.
- Summer 2014 **ICM 2014 Satellite Meeting: Classification Theory Workshop**, *NIMS, Daejeon Korea*, Strong minimality of the  $j$ -function.
- Summer 2014 **Logic, Dynamics, and Their Interactions II**, *University of North Texas*, The isomorphism problem for countable differentially closed fields .
- Spring 2014 **MSRI Seminar**, Superstability and central extensions of algebraic groups.
- Spring 2014 **MSRI Postdoc Seminar**, Strong minimality of the  $j$ -function .
- Spring 2014 **AMS Western Spring Sectional Meeting, Special Session: Arithmetic and Differential Algebraic Geometry**, Differential algebra and the  $j$ -invariant.
- Spring 2014 **AMS Central Spring Sectional Meeting, Special Session: Differential Algebra and Galois Theory**, The Kolchin Irreducibility Theorem.
- Spring 2013 **CIRM Workshop: The geometry of the Frobenius automorphism**, *Luminy*, Co-analysability and inertial dimension.
- Spring 2013 **GTM Seminar**, *Paris 7*, Model theory of partial differential fields.
- Spring 2013 **Kolchin Seminar in Differential Algebra**, *City University of New York*, An Application of Differential Completeness.
- Fall 2012 **Kolchin Seminar in Differential Algebra**, *City University of New York*, Indecomposability for Differential Algebraic Groups.
- Fall 2012 **Model Theory Seminar**, *University of California, Los Angeles*, Bertini theorems for differential algebraic geometry.
- Summer 2012 **Differential Schemes and Differential Cohomology**, *Banff International Research Station*, Local problems in differential algebra.
- Spring 2012 **Special Session on Model Theory**, *2012 AMS Spring Western Sectional Meeting at the University of Hawaii*, Differential algebraic groups as superstable groups.
- Spring 2012 **Differential Algebraic Geometry and Galois Theory in memory of Jerald Kovacic**, *2012 Joint Math Meetings*, Almost simple differential algebraic groups.
- Spring 2012 **Logic Seminar**, *Weslyan University*, Bertini's theorem for differential algebraic varieties.
- Spring 2012 **Logic Seminar**, *The Ohio State University*, Differential algebra and numerical polynomials.
- Spring 2012 **Graduate Student Conference in Logic**, *University of Notre Dame*, Model theory of Painlevé equations.
- Fall 2011 **South Wisconsin Logic Colloquim**, *University Wisconsin*, Simple differential algebraic groups of finite Morley rank.

- Fall 2011 **Model Theory Seminar**, *University of Illinois at Urbana-Champaign*, Strongly connected differential algebraic groups.
- Fall 2011 **Model Theory Seminar**, *University of Notre Dame*, Applications of stable group theory to differential algebraic groups.
- Fall 2011 **Model Theory Seminar**, *University of Waterloo*, Groups of small typical differential dimension.
- Fall 2011 **Kolchin Seminar in Differential Algebra**, *City University of New York*, Almost simple differential algebraic groups.
- Fall 2011 **Logic Seminar**, *University of Maryland*, Differential Algebraic Groups as Superstable Groups.
- Spring 2011 **Midwest Model Theory**, *The Ohio State University*, Indecomposability in Partial Differential Fields.
- Spring 2010 **Graduate Student Conference in Logic**, *University of Wisconsin, Madison*, Genericity in differential fields.
- Fall 2010 **Southern Wisconsin Logic Colloquium**, *University of Wisconsin*, The axioms of differentially closed fields.
- Fall 2010 **Definability in Number Theory**, *University of Ghent*, Difference Field Extensions.
- Fall 2010 **Kolchin Seminar in Differential Algebra**, *City University of New York*, Definability of rank in the differential parameter space.
- Fall 2010 **Model Theory Seminar**, *City University of New York*, The axioms of differential fields.
- Spring 2010 **Kolchin Seminar in Differential Algebra**, *City University of New York*, Generic Points are not necessarily generic.

---

## Professional Service

- 2021 **Member**, *Salary Committee*, MSCS, University of Illinois at Chicago.
- 2020-2021 **Member**, *Advisory Committee*, MSCS, University of Illinois at Chicago.
- 2019-2021 **Chair**, *Teaching review program for Research Assistant Professors*, MSCS, University of Illinois at Chicago.
- 2019-2020 **Member and secretary**, *Advisory Committee*, MSCS, University of Illinois at Chicago.
- 2019-2020 **Member**, *MCS Hiring Committee*, MSCS, University of Illinois at Chicago.
- 2019-2020 **Chair**, *Colloquium Committee*, MSCS, University of Illinois at Chicago.
- 2018-2019 **Member**, *Colloquium Committee*, MSCS, University of Illinois at Chicago.
- 2017-present **Organizer**, *Logic Seminar*, MSCS, University of Illinois at Chicago.
  - Fall **Organizer**, *Midwest Model Theory Day*, MSCS, University of Illinois at Chicago.
- 2016-present
  - Fall **Organizer**, *Model Theory Seminar*, University of California, Los Angeles.
- 2015-2016
  - Fall **Organizer**, *Model Theory Seminar*, University of California, Berkeley.
- 2013-2015
- Spring 2012 **Organizer**, *Graduate Student Mathematics Colloquium*, University of Illinois at Chicago.

- 2009-2010 **Organizer**, *Louise Hay Logic Seminar*, University of Illinois at Chicago and University of Chicago.
- Spring 2011 **Organizer**, *Graduate Student Logic Conference*, University of Illinois at Chicago.
- Spring 2011 **Memeber**, *Faculty Mentoring Award Nomination Committee*, University of Illinois at Chicago.
- Referee**, *Compositio Mathematica*, *Transactions of the American Mathematical Society*, *Proceedings of the American Mathematical Society*, *Archive for Mathematical Logic*, *Bulletin for Symbolic Logic*, *Journal of the Institute of Mathematics of Jussieu*, *Journal of Symbolic Logic*, *Mathematical Logic Quarterly*, *Algorithmic Learning Theory*, *Algebra and Number Theory*, *Selecta*, *Advances in Mathematics*, *Communications in Algebra*, *Journal of Pure and Applied Algebra*, *Journal of Algebra*.
- Seminar notes and mathematics**, <http://jamesfreitag.wordpress.com/>.

## Teaching and mentoring

- 2018-present **Assistant professor**, *University of Illinois at Chicago*.  
Jonathan Wolf (PhD 2019), weekly meetings from Fall 2017. Hunter Chase (PhD 2020), weekly meetings from Fall 2016. Winner 2018 Award for Graduate Research and 2020 NSF Postdoctoral Fellowship. Alexander Berenbiem (PhD 2021), weekly meetings from Spring 2019. Matthew Devilbiss (PhD expected 2022), weekly meetings from Spring 2018. Kevin Zhou (PhD expected 2023), weekly meetings from Spring 2019.
- 2018-Present **Assistant Professor**, *University of Illinois at Chicago*, Dissertation Committees:  
Jonathan Wolf, Hunter Chase, Gregory Cousins (Notre Dame), Nigel Pynn-Coates (UIUC), Kevin Visseut, Dylon Chow, Carl Thomas Dean, Noah Schoem, Paul Rapoport, Sarthak Chimni, Alexander Berenbiem.
- Fall 2017 **Research Assistant professor**, *University of Illinois at Chicago*.  
Math 512 Advanced Topics in Logic. 10 students. An original graduate course on differential equations, differential galois theory, and model theory.
- Spring 2018 **Research Assistant professor**, *University of Illinois at Chicago*.  
Math 215 Introduction to Advanced Mathematics, 25 students. Math 210 Calculus III, 40 students.
- Fall 2018 **Assistant professor**, *University of Illinois at Chicago*.  
Math 210 Calculus III, 40 students.
- Spring 2019 **Assistant professor**, *University of Illinois at Chicago*.  
Math 215 Introduction to Advanced Mathematics, 25 students. Math 313, Real Analysis, 25 students.
- Fall 2019 **Assistant professor**, *University of Illinois at Chicago*.  
Math 215 Introduction to Advanced Mathematics, 25 students. Math 430 Mathematical Logic, 20 students.
- Spring 2020 **Assistant professor**, *University of Illinois at Chicago*.  
Math 506, Model Theory, 10 students.
- Spring 2021 **Assistant professor**, *University of Illinois at Chicago*.  
Math 512, o-minimality and applications to number theory, 15 students.
- Spring 2022 **Associate professor**, *University of Illinois at Chicago*.  
Math 320, Linear algebra, 25 students. Math 181, Calculus II, 250 students.
- 2015-2016 **Postdoc**, *University of California, Los Angeles*.  
Taught linear algebra, differential equations, multivariable calculus.
- 2012-2015 **Postdoc**, *University of California, Berkeley*.  
Taught real analysis, incompleteness and undecidability, graduate model theory.

2007-2012 **Graduate Teaching Assistant**, *University of Illinois at Chicago*.

Taught online sections of beginning algebra courses. Supervised discussion sections for discrete math, linear algebra, and calculus. Graded for Math 516, Second Course in Abstract Algebra I, a second semester graduate algebra course. Graded for upper division linear algebra.

2005-2007 **Graduate Teaching Assistant**, *Michigan State University*.

Created and taught courses for beginning algebra students in the Math Enrichment workshop, Math 100E. Created and taught finite mathematics courses. Taught geometry for mathematics education.

---

## Research Awards

2012 **Winner, Outstanding Thesis Prize, University of Illinois at Chicago**, <http://grad.uic.edu/cms/>, \$1000.

---

## References

**Thomas Scanlon**, *University of California, Berkeley*, scanlon@math.berkeley.edu.

**Dave Marker**, *University of Illinois at Chicago*, marker@math.uic.edu.

**Rahim Moosa**, *University of Waterloo*, rmoosa@uwaterloo.ca.

**Michael Singer**, *North Carolina State University*, singer@math.ncsu.edu.