

## **CURRICULUM VITAE**

MATTHIAS ASCHENBRENNER

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University of California, Los Angeles

Department of Mathematics

Box 951555

Los Angeles, CA 90095-1555, U.S.A.

E-mail: [matthias@math.ucla.edu](mailto:matthias@math.ucla.edu)

Home page: <http://www.math.ucla.edu/~matthias>

Office Phone: (310) 206-8576

Fax: (310) 206-6673

### **PERSONAL DATA**

Born in Kötzing, Germany.

German and U.S. Citizen.

### **EDUCATION**

- University of Illinois at Urbana-Champaign, 1997–2001  
Ph.D., 2001; M.S., 1999. Advisor: Lou van den Dries.
- Brandeis University, 1996–1997  
Non-degree graduate studies.
- Universität Passau, Germany, 1993–1996  
Vordiplom in Computer Science, with a minor in Mathematics, 1995.

### **EMPLOYMENT**

- University of California, Los Angeles: Professor (2011–present); Associate Professor (2007–2011).
- University of Illinois at Chicago: Associate Professor (2006–2007); Assistant Professor (2003–2006).
- Mathematical Sciences Research Institute, Berkeley: Postdoctoral Member (Spring 2003).
- University of California at Berkeley: Charles B. Morrey Jr. Visiting Research Assistant Professor (2001–2002).

## AWARDS AND GRANTS

- UCLA Faculty Research Grant, 2016.
- Research Professorship, Mathematical Sciences Research Institute, Berkeley, CA, program in Model Theory, Arithmetic Geometry and Number Theory, 2014.
- Fellow, American Mathematical Society, 2012.
- National Science Foundation Research Grants DMS-0303618, DMS-0556197, DMS-0969642, DMS-1700439.
- University of Illinois at Chicago Campus Research Board Grant (2006–2007).
- Gerald E. Sacks Prize for best Ph.D. thesis in logic worldwide, Association for Symbolic Logic, 2001.
- Kuo-Tsai Chen Prize for scholastic achievement by a graduate student, Department of Mathematics, University of Illinois at Urbana-Champaign, 1999.
- Deutscher Akademischer Austauschdienst, scholarship for study abroad, 1996.
- Undergraduate scholarship of the Bayerische Begabtenförderung, 1993.

## PUBLICATIONS AND PREPRINTS

1. *On numbers, germs, and transseries* (with L. van den Dries and J. van der Hoeven), submitted. (20 pp.)
2. *Maximal immediate extensions of valued differential fields* (with L. van den Dries and J. van der Hoeven), submitted. (28 pp.)
3. *The logical complexity of finitely generated commutative rings* (with A. Khélif, E. Nazzari, and T. Scanlon), submitted. (39 pp.)
4. *An effective Weierstrass Division Theorem*, submitted. (68 pp.)
5. *The surreal numbers as a universal  $H$ -field* (with L. van den Dries and J. van der Hoeven), J. Eur. Math. Soc. (JEMS), to appear. (18 pp.)
6. *Whitney's Extension Problem in  $o$ -minimal structures* (with A. Thamrongthanyalak), Rev. Mat. Iberoam., to appear. (19 pp.)
7. *Dimension in the realm of transseries* (with L. van den Dries and J. van der Hoeven), in: F. Broglia et al. (eds.): *Ordered Algebraic Structures and Related Topics*, pp. 23–39, Contemp. Math., vol. 697, Amer. Math. Soc., Providence, RI, 2017.
8. *Asymptotic Differential Algebra and Model Theory of Transseries* (with L. van den Dries and J. van der Hoeven), Annals of Mathematics Studies, vol. 195, Princeton University Press, Princeton, NJ, 2017.

9. *Decision problems for 3-manifolds and their fundamental groups* (with S. Friedl and H. Wilton), *Geom. Topol. Monogr.* **19** (2015), 201–236.
10. *Vapnik-Chervonenkis density in some theories without the independence property, I* (with A. Dolich, D. Haskell, D. Macpherson, and S. Starchenko), *Trans. Amer. Math. Soc.* **368** (2016), 5889–5949.
11. *Julia’s Equation and differential transcendence* (with W. Bergweiler), *Illinois J. Math.* **59** (2015), no. 2, 277–294.
12. *3-Manifold Groups* (with S. Friedl and H. Wilton), EMS Series of Lectures in Mathematics, vol. 20, European Mathematical Society (EMS), Zürich, 2015.
13. *Michael’s Selection Theorem in a semilinear context* (with A. Thamrongthanyalak), *Adv. Geom.* **15** (2015), no. 3, 293–313.
14. *Transseries and Todorov-Vernaev’s asymptotic fields* (with I. Goldbring), *Arch. Math. Logic* **53** (2014), 65–87.
15. *Toward a model theory for transseries*, (with L. van den Dries and J. van der Hoeven), *Notre Dame J. Form. Log.* **54** (2013), no. 3-4, 279–310.
16. *Vapnik-Chervonenkis density in some theories without the independence property, II* (with A. Dolich, D. Haskell, D. Macpherson, and S. Starchenko), *Notre Dame J. Form. Log.* **54** (2013), no. 3-4, 311–363.
17. *3-Manifold Groups are Virtually Residually  $p$*  (with S. Friedl), *Mem. Amer. Math. Soc.* **225** (2013), no. 1058.
18. *Logarithms of iteration matrices, and proof of a conjecture by Shadrin and Zvonkine*, *J. Combin. Theory Ser. A* **119** (2012), 627–654.
19. *Algorithms for computing saturations of ideals in finitely generated commutative rings*, appendix to the paper: B. Poonen, *Automorphisms mapping a point into a subvariety*, *J. Algebraic Geom.* **20** (2011), 785–794.
20. *Residual properties of graph manifold groups* (with S. Friedl), *Topology Appl.* **158** (2011), 1179–1191.
21. *A criterion for HNN extensions of finite  $p$ -groups to be residually  $p$*  (with S. Friedl), *J. Pure Appl. Algebra* **215** (2011), 2280–2289.
22. *Definable versions of theorems by Kirszbraun and Helly* (with A. Fischer), *Proc. London Math. Soc.* **102** (2011), 468–502.
23. *Degree bounds for Gröbner bases in algebras of solvable type* (with A. Leykin), *J. Pure Appl. Algebra* **213** (2009), 1578–1605.
24. *An algorithm for finding symmetric Gröbner bases in infinite dimensional rings* (with C. Hillar), in: D. J. Jeffrey (ed.), *ISSAC 2008*, pp. 117–123, Association for Computing Machinery (ACM), New York, 2008.

25. *Lefschetz extensions, tight closure, and big Cohen-Macaulay algebras* (with H. Schoutens), Israel J. Math. **161** (2007), 221–310.
26. *Finite generation of symmetric ideals* (with C. Hillar), Trans. Amer. Math. Soc. **359** (2007), 5171–5192.
27. *Finiteness theorems in stochastic integer programming* (with R. Hemmecke), Found. Comput. Math. **7** (2007), 183–227.
28. *Strongly minimal groups in the theory of compact complex spaces* (with R. Moosa and T. Scanlon), J. Symbolic Logic **71** (2006), 529–552.
29. *Differentially algebraic gaps* (with L. van den Dries and J. van der Hoeven), Selecta Math. **11** (2005), 247–280.
30. *Bounds and definability in polynomial rings*, Quart. J. Math. **56** (2005), 263–300.
31. *Reduction mod  $p$  of standard bases*, Comm. Algebra **33** (2005), 1635–1661.
32. *Asymptotic differential algebra* (with L. van den Dries), in: O. Costin, M. D. Kruskal, A. Macintyre (eds.), *Analyzable Functions and Applications*, pp. 49–85, Contemp. Math., vol. 373, Amer. Math. Soc., Providence, RI, 2005.
33. *Liouville closed  $H$ -fields* (with L. van den Dries), J. Pure Appl. Algebra **197** (2005), 83–139.
34. *Orderings of monomial ideals* (with W.-Y. Pong), Fund. Math. **181** (2004), 27–74.
35. *Ideal membership in polynomial rings over the integers*, J. Amer. Math. Soc. **17** (2004), 407–441.
36. *Some remarks about asymptotic couples*, in: F.-V. Kuhlmann, S. Kuhlmann, M. Marshall (eds.), *Valuation Theory and its Applications*, II, pp. 7–18, Fields Institute Publications, vol. 33, AMS, Providence, RI, 2003.
37.  *$H$ -fields and their Liouville extensions* (with L. van den Dries), Math. Z. **242** (2002), 543–588.
38. *Closed asymptotic couples* (with L. van den Dries), J. Algebra **225** (2000), 309–358.

#### INVITED LECTURES AT CONFERENCES

- *Conference on Mathematical Logic*, Niterói, Brazil, August 2018 (scheduled).
- *International Congress of Mathematicians*, Section Logic and Foundations, Rio de Janeiro, Brazil, August 2018 (scheduled).
- *Workshop on Model Theory of Valued Fields*, Institut Henri Poincaré, Paris, March 2018 (scheduled).
- *Special Session in Model Theory*, American Mathematical Society Sectional Meeting, University of California, Riverside, November 2017.

- *Eighth International Workshop in Differential Algebra and Related Topics (DART VIII)*, Johannes-Kepler-Universität Linz, Austria, September 2017.
- *Association for Symbolic Logic North American Annual Meeting*, Boise, ID, March 2017.
- *Model Theory: from Fields to Hardy Fields*, Fields Institute, Toronto, ON, August 2016.
- *Summer School in Tame Geometry*, Universität Konstanz, Germany, July 2016.
- *The 9th Whitney Problems Workshop*, Technion–Israel Institute of Technology, Haifa, Israel, June 2016.
- *O-Minimality and Applications*, Universität Konstanz, Germany, July 2015.
- *Artin Approximation and Infinite Dimensional Geometry*, Centre International de Rencontres Mathématiques, Luminy, Marseilles, March 2015.
- *Colloquium Logicum 2014*, Universität der Bundeswehr, München, Germany, September 2014.
- *Logic Colloquium 2014*, Karp Prize laudation, Vienna, Austria, July 2014.
- *Model Theory 2013*, Ravello, Italy, June 2013.
- *Association for Symbolic Logic North American Annual Meeting*, Waterloo, ON, May 2013.
- *Workshop on Neostability Theory*, Banff International Research Station, Banff, AB, January/February 2012.
- *O-minimal Structures and Real Analytic Geometry Retrospective Workshop*, Fields Institute, Toronto, ON, August 2011.
- *Logic Colloquium 2011*, Special Session in Model Theory, Barcelona, Spain, July 2011.
- *Logicum Urbanae Lugduni*, Lyon, France, July 2009.
- *Third International Workshop in Differential Algebra and Related Topics (DART III)*, Rutgers University at Newark, NJ, November 2008.
- *Workshop on Model Theory and Computable Model Theory*, University of Florida, Gainesville, FL, February 2007.
- *Canadian Mathematical Society Meeting Summer 2006*, University of Calgary, Calgary, AB, June 2006.
- *Workshop on Model Theory, Algebraic and Analytic Geometry*, Newton Institute for Mathematical Sciences, Cambridge, UK, July 2005.

- *Association for Symbolic Logic Winter Meeting*, Plenary lecture, Atlanta, GA, January 2005.
- *Logic Colloquium 2004*, Special Session in Model Theory, Torino, Italy, July 2004.
- Workshop on *Model Theory and Complex Analytic Geometry*, Mathematisches Forschungsinstitut Oberwolfach, Germany, July 2004.
- Workshop on *Interactions between Model Theory and Geometry*, Banff International Research Station, Banff, AB, March 2004.
- *Midwest Model Theory Meeting*, Toronto, ON, November 2003.
- *Logic Colloquium 2003*, Plenary lecture, Helsinki, Finland, August 2003. (cancelled)
- *American Mathematical Society Sectional Meeting*, plenary lecture, Courant Institute, New York, April 2003.
- Workshop on *Computational Commutative Algebra*, Mathematical Sciences Research Institute, Berkeley, CA, March 2003.
- *Colloquium Logicum 2002*, Ph.D. colloquium, Universität Münster, Germany, August 2002.
- Workshop on *Analyzable Functions and Applications*, International Centre for Mathematical Sciences, Edinburgh, UK, June 2002.
- *Euro-Conference in Model Theory and Applications*, Ravello, Italy, May 2002.
- *Special Session in Model Theory*, First Joint Meeting of the American Mathematical Society and the Société Mathématique de France, Lyon, France, July 2001.
- *Second Annual Colloquiumfest*, University of Saskatchewan, Saskatoon, SK, March 2001.
- *Midwest Model Theory Meeting*, University of Wisconsin, Madison, WI, November 2000.
- Workshop on *Model Theory of Henselian Valued Fields*, International Centre for Mathematical Sciences, Edinburgh, UK, May 1999.

#### **INVITED LECTURES IN SEMINARS AND COLLOQUIA**

- *Model Theory Seminar*, University of Illinois at Urbana-Champaign, April 2017.
- *Pure Mathematics Seminar*, Montana State University, Bozeman, MT, March 2017.
- *Department Colloquium*, University of Connecticut, February 2016.
- *Department Colloquium*, California State University at Dominguez Hills, September 2015.
- *CUNY Model Theory Seminar*, City University of New York, May 2015.

- *Research Seminar*, Mathematical Sciences Research Institute, Berkeley, CA, March 2014.
- *Kolloquium*, Humboldt-Universität zu Berlin, February 2013.
- *CUNY Logic Workshop*, City University of New York, April 2011.
- *Oberseminar Logik*, Humboldt-Universität zu Berlin, December 2010.
- *Oberseminar Analysis*, Christian-Albrechts-Universität zu Kiel, November 2010.
- *Kolloquium*, Institut für Mathematische Logik und Grundlagenforschung, Universität Münster, November 2009.
- *Department Colloquium*, California State University at Dominguez Hills, October 2009.
- *Logic Seminar*, University of Notre Dame, September 2009.
- *UIC Logic Seminar*, University of Illinois at Chicago, September 2009.
- *UCLA Mathematics Colloquium*, University of California, Los Angeles, May 2009.
- *Pure Math Colloquium*, University of Waterloo, Waterloo, ON, January 2009.
- *Kolloquium*, Institut für Mathematische Logik und Grundlagenforschung, Universität Münster, Juni 2008.
- *Kolloquium*, Universität Freiburg, Juni 2008.
- *Berkeley Logic Colloquium*, University of California at Berkeley, March 2008.
- *UCLA Logic Colloquium*, University of California, Los Angeles, March 2007.
- *Seminar*, Ohio State University, Columbus, OH, January 2007.
- *Logic Seminar*, Cornell University, Ithaca, NY, November 2006.
- *Mathematics Colloquium*, Middlebury College, Middlebury, VT, October 2006.
- *Departmental Colloquium*, University of Wisconsin, Madison, WI, October 2006.
- *Southern Wisconsin Logic Seminar*, University of Wisconsin, Madison, WI, April 2006.
- *Logic Seminar*, University of Notre Dame, April 2005.
- *Model Theory Seminar*, McMaster University, Hamilton, ON, February 2005.
- *Discrete Mathematics Seminar*, University of California at Davis, October 2002.
- *Mathematics Colloquium*, University of Illinois at Chicago, February 2002.
- *Logic Seminar*, University of Notre Dame, February 2002.
- *Berkeley Logic Colloquium*, University of California at Berkeley, October 2001.

- *MIT Logic Seminar*, Massachusetts Institute of Technology, Cambridge, MA, May 2001.
- *Logic Seminar*, Wesleyan University, Middletown, CT, April 2001.
- Lectures in the *Seminar on Hardy fields*, University of Saskatchewan, Saskatoon, SK, March 2001.
- *Algebraic Geometry Seminar*, Princeton University, February 2001.
- *Southern Wisconsin Logic Seminar*, University of Wisconsin, Madison, WI, January 2001.
- *Forschungsseminar Prof. Prestel*, Universität Konstanz, Germany, July 1999.
- Lecture series in the *Oberseminar Prof. Knebusch*, Universität Regensburg, Germany, June–July 1999.

#### CONTRIBUTED TALKS

- *Association for Symbolic Logic Winter Meeting*, Special Session in Model Theory, New Orleans, LA, January 2001.
- *Association for Symbolic Logic Annual Meeting*, Special Session in Model Theory, Urbana, IL, June 2000.
- *International Conference and Workshop on Valuation Theory*, University of Saskatchewan, Saskatoon, SK, August 1999.

#### RESEARCH VISITS

- Institut Henri Poincaré, Paris, France, January–March 2018 (scheduled).
- Mathematical Sciences Research Institute, Berkeley, CA, January–March 2014.
- Humboldt-Universität Berlin, Germany, August–December 2010.
- Fields Institute, Toronto, ON, January–March 2009 and June 2009.
- Université Paris Sud, Orsay, France, July 2006.
- Newton Institute, Cambridge University, UK, May–July 2005.
- Mathematical Sciences Research Institute, Berkeley, CA, January–May 2003.
- Université Paris Sud, Orsay, France, July 2001.
- University of Saskatchewan, March 2001.
- Universität Regensburg, Germany, June/July 1999.



## **PROFESSIONAL SERVICE**

- Refereeing for numerous journals, Springer-Verlag and Birkhäuser Verlag book programs, Minerva Foundation, National Science Foundation, Simons Foundation, Leverhulme Trust, Nederlandse Organisatie voor Wetenschappelijk Onderzoek, Mathematical Reviews.
- Member of the editorial board of *Journal of Symbolic Logic* (2016–present), *Mathematical Logic Quarterly* (2014–2016), *Order* (2005–present).
- Member of the *Committee on Logic in North America* of the Association for Symbolic Logic (2012–present).
- Member of the program committee for the Annual Meeting 2007 of the Association for Symbolic Logic, Gainesville, FL; Winter Meeting 2013 of the Association for Symbolic Logic, San Diego, CA; Colloquium Logicum 2016, Hamburg, Germany.
- Organizer of a winter school during the special semester on o-minimal structures and real analytic geometry at the Fields Institute, Toronto, January 2009.
- Organizer of the Model Theory Seminar at UIC, Spring 2004–Fall 2006.

## **MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS**

- Association for Symbolic Logic, since 1998.
- American Mathematical Society, since 1996.
- Deutsche Mathematikervereinigung, since 2004.

## **POSTDOCS SUPERVISED**

- Isaac Goldbring, 2009–2012. (Now Assistant Professor at the University of California, Irvine.)
- Williams Simmons, 2013–2014. (Now Rademacher Instructor, University of Pennsylvania.)
- James Freitag, 2015–2016. (Now postdoc at University of Illinois at Chicago.)
- Allen Gehret, 2017–present.

## **PH.D. STUDENTS SUPERVISED**

- Madeline Barnicle.
- Anton Bobkov, 2017. (Now Instructor at Ripon College, Ripon, WI.)
- Athipat Thamrongthanyalak, 2013. (Now Zassenhaus Assistant Professor at Ohio State University, Columbus, OH.)
- Erik Walsberg, 2015. (Now J. L. Doob Research Assistant Professor, University of Illinois at Urbana-Champaign.)