



Philipp Hieronymi

Research interests

Mathematical Logic, in particular model theory, o-minimality, its generalizations and their applications.

Theoretical Computer Science, in particular automata theory, complexity theory and computability theory.

Positions

2018– **Director**, *Illinois Geometry Lab, University of Illinois at Urbana-Champaign.*

2017– **Associate Professor**, *University of Illinois at Urbana-Champaign.*

2012–17 **Assistant Professor**, *University of Illinois at Urbana-Champaign.*

2010–12 **JL Doob Research Assistant Professor**, *University of Illinois at Urbana-Champaign.*

Supervisor: Lou van den Dries

2009 **Fields Institute and McMaster University**, *German Academic Exchange Service Postdoctoral Scholar.*

Supervisor: Patrick Speissegger

Education

2005–08 **Doctor of Philosophy in Mathematics**, *University of Oxford, UK.*

Supervisor: Alex Wilkie

2000–06 **Diplom in Mathematics with a minor in Computer Science**, *University of Bonn, Germany.*

Supervisor: Peter Koepke

2003–04 **Master of Advanced Study in Mathematics ('Part III')**, *University of Cambridge, UK.*

Supervisor: Peter Johnstone

2002–08 **Bachelor of Science in Economics**, *University of Bonn, Germany.*

External Grants

2017–2022 **National Science Foundation CAREER Grant**, *DMS-1654725 (\$400,002).*

- 2013–2016 **National Science Foundation Grant**, *DMS-1300402 (\$140,225)*.
 2009 **German Academic Exchange Service Postdoctoral Scholarship**, *(\$37,000)*.

Internal Grants

- 2020 **Strategic Instructional Innovations Program**, *(senior personell), Early Instruction in Linear Algebra and Computational Tools in the Curriculum of CS, MechSE, and Grainger Engineering*.
 This project redesigns instruction in concepts of linear algebra and linear structures, in order to provide undergraduates in MechSE, CS, and other departments with substantive, practical knowledge in these essential fields early in the curriculum.
- 2019 **Office of Undergraduate Research Development Grant**, *(\$10,000)*.
 This project supported summer research projects for first and second year undergraduates under the umbrella of the Illinois Geometry Lab. These research projects were designed to bridge the gap between basic courses in mathematics such as Calculus I and II and more advanced research projects within the IGL, and to provide rewarding research opportunities which freshmen and sophomores can complete in a realistic time frame.
- 2014 **UIUC Campus Research Board Award**, *(\$10,418)*.
 2013 **UIUC Campus Research Board Award**, *(\$13,370)*.

Scholarships, Prizes & honors

- 2018 **Campus Award for Excellence in Undergraduate Teaching by Faculty**, *University of Illinois at Urbana-Champaign, USA*.
 recognizes sustained excellence and innovative approaches in undergraduate teaching and contributions beyond classroom instruction
- 2018 **Dean's Awards for Excellence in Undergraduate Teaching**, *College of Liberal Arts and Sciences, University of Illinois at Urbana-Champaign, USA*.
 teaching award to honor the college's best tenure system faculty
- 2017 **CAREER Award**, *National Science Foundation, USA*.
 NSF's most prestigious awards in support of early-career faculty
- 2017 **Helen Corley Petit Scholar**, *College of Liberal Arts and Sciences, University of Illinois at Urbana-Champaign, USA*.
 given to recently promoted associate professors with extraordinary record
- 2016 **Evelyn Nelson Lecture 2015-16**, *McMaster University, Canada*.
 named lecture series focused on matters relating to the Foundations of Mathematics
- 2015 **N. Tenney Peck Teaching Award in Mathematics**, *University of Illinois at Urbana-Champaign, USA*.
 given to tenure-track faculty for exemplary teaching
- 2012 **Back2Fields Colloquium**, *Fields Institute, Canada*.
 colloquium series to 'celebrate the accomplishments of former postdoctoral fellows of Fields Institute thematic programs'
- 2007–08 **Merton College Prize Scholarship**, *University of Oxford, UK*.
 awarded to 'the graduate students at Merton who are of the highest distinction'
- 2006–08 **Predocctoral Scholarship**, *German Academic Exchange Service (DAAD)*.
 Predocctoral scholarship for graduate studies at the University of Oxford

- 2005–08 **Predocctoral Scholarship**, *Engineering and Physical Science Research Council*, UK.
- 2004 **Rosalind Lady Carlisle Scholarship**, *Girton College*, University of Cambridge.
- 2004 **May Smithels Prize**, *Girton College*, University of Cambridge.
awarded for 'distinction in Part III of the Mathematical Tripos at Cambridge'
- 2003-04 **Hölderlin Scholarship**, *Allianz Lebensversicherung AG*, Germany.
Scholarship for graduate studies at the University of Cambridge
- 2000-05 **Scholarship of the German National Academic Foundation**, (*Studienstiftung des deutschen Volkes*).
awarded to the top 0.25 per cent of German students

Publications

Mathematics

- 2008 **[0] The real field with an irrational power function and a dense multiplicative subgroup**, *DPhil Thesis, Oxford, Nov. 2008*.
- 2010 **[1] Defining the set of integers in expansions of the real field by a closed discrete set**, *Proc. Amer. Math. Soc.* 138 (2010) 2163-2168.
- 2011 **[2] Dependent pairs**, with A. Günaydin, *J. Symb. Logic* (2) 76 (2011) 377-390.
- [3] The real field with the rational points of an elliptic curve**, with A. Günaydin, *Fund. Math.* 211 (2011) 15-40.
- [4] The real field with an irrational power function and a dense multiplicative subgroup**, *J. London Math. Soc.* (2) 83 (2011) 153-167.
- [5] Expansions of subfields of the real field by a discrete set**, *Fund. Math.* 215 (2011) 167-175.
- 2012 **[6] Expansions which introduce no new open sets**, with G. Boxall, *J. Symb. Logic* (1) 77 (2012) 111-121 .
- 2013 **[7] A dichotomy for expansions of the real field**, with A. Fornasiero and C. Miller, *Proc. Amer. Math. Soc.* 141 (2013) 697-698 .
- [8] An analogue of the Baire Category Theorem**, *J. Symb. Logic* (1) 78 (2013) 207-213 .
- 2014 **[9] Interpreting the projective hierarchy in expansions of the real line**, with M. Tychonievich, *Proc. Amer. Math. Soc.* 142 (2014) 3259-3267 .
- 2015 **[10] A fundamental dichotomy for definably complete expansions of ordered fields**, with A. Fornasiero, *J. Symb. Logic* (4) 80 (2015) 1091-1115.
- 2016 **[11] Expansions of the ordered additive group of real numbers by two discrete subgroups**, *J. Symb. Logic* (3) 81 (2016) 1007–1027.
- 2017 **[12] Distal and non-distal pairs**, with T. Nell, *J. Symb. Logic* (1) 82 (2017) 375-383.
- [13] How to avoid a compact set**, with E. Walsberg, A. Fornasiero, *Adv. Math.* 317 (2017) 758-785.
- 2018 **[14] Ostrowski numeration systems, addition and finite automata**, with A. Terry Jr., *Notre Dame J. Formal Logic* (2) 59 (2018) 215-232.

- [15] **A tame Cantor set**, *J. European Math. Soc.* (9) 20 (2018) .
- [16] **Interpreting the monadic second order theory of one successor in expansions of the real line**, with *E. Walsberg*, *Israel J. Math.* (1) 224 (2018).
- [17] **Wild theories with o-minimal open core**, with *E. Walsberg and T. Nell*, *Ann. Pure Appl. Logic* (2) 169 (2018) 146-163.
- 2019 [18] **When is scalar multiplication decidable?**, *Ann. Pure Appl. Logic* (10) 170 (2019) 1162-1175.
- [19] **Metric dimensions and tameness in expansions of the real field**, with *C. Miller*, *Trans. Amer. Math.* 373 (2020) 849-874 .
- [20] **Expansions of the real field by discrete subgroups of $Gl_n(\mathbb{C})$** , with *E. Walsberg and S. Xu*, *Proc. Amer. Math.* (2020) to appear.
- [21] **An o-minimal trace that does not eliminate imaginaries**, with *P. Eleftheriou*, Appendix to: **Small sets in dense pairs** by *P. Eleftheriou*, *Israel J. Math.* (2019) to appear.
- [22] **Continuous regular functions**, with *Alexi Block Gorman, Elliot Kaplan, Ruoyu Meng, Erik Walsberg, Zihe Wang, Ziqin Xiong and Hongru Yang*, *Log. Methods. Computer Science* (1) 16 (2020).
- [23] **Structure theorems in tame expansions of o-minimal structures by a dense set**, with *P. Eleftheriou and A. Günaydin*, *Israel J. Math.* (2019) to appear.
- 2020 [24] **The Choice Property in tame expansions of o-minimal structures**, with *P. Eleftheriou and A. Günaydin*, *Math. Logic Quart.* (2) 66 (2020) 239-246..
- [25] **Pairs of Theories Satisfying a Mordell-Lang Condition**, with *A. Block Gorman and E. Kaplan*, *Fund. Math.* 251(2) (2020) 131-160.
- Preprints [26] **Definability and decidability in expansions by generalized Cantor sets**, with *W. Balderrama*, submitted.
- [27] **On continuous functions definable in expansions of the ordered real additive group**, with *E. Walsberg*.
- [28] **Presburger Arithmetic with algebraic scalar multiplications**, with *D. Nguyen and I. Pak*, submitted.
- [29] **Fractals and the monadic second order theory of one successor**, with *Erik Walsberg*.

Economics

- [1] **The Clean-Development Mechanism, stochastic permit prices and energy investments**, with *D. Schüller*, *Energy Economics* 47 (2015) 25–36.
- [2] **The Influence of Permit Price Uncertainty and Lobbying on Energy Investments**, with *D. Schüller*, in *'Emissions Trading as a Policy Instrument: Evaluation and Prospects'*, CESifo Seminar Series, MIT Press (2015) 87-120.

Other

[1] **Geometry Labs United: An Invitation**, with Jayadev Athreya, David Dumas, William Goldman, Sergey Grigorian, Rosemary Guzman, Sean Lawton, Anton Lukyanenko, Jeremy Tyson, and Aaron Wilson, *Notices Amer. Math. Soc.* (9) 65 (2018) 1088-1094.

Work by students

[1] **On expansions of the real field by complex subgroups**, by Erin Caulfield, *Ann. Pure Appl. Logic* 168 (2017) 1308–1334.

[2] **Distal and non-Distal Behavior in Pairs**, by Travis Nell, *Math. Log. Quart.* (1) 65 (2019) 23-36.

[3] **Pecan - an automated theorem prover**, by Reed Oei and Dun Man, available on [GitHub](#).

Advising

Postdocs

1. **Erik Walsberg** (2016-18 - first position: Postdoc UC Irvine)

PhD students

1. **Erin Caulfield** (graduated 2018 - first position: Postdoc McMaster University)
2. **Travis Nell** (graduated 2019)
3. **Alexi Block Gorman** (since 2017)
4. **Christian Schulz** (since 2018)
5. **Rocco Davino** (since 2019)
6. **Eion Blanchard** (since 2019)

Graduate students (who participated in research projects/reading courses)

1. **Pete Glaze** (2010-2011)
2. **Nathan Rehfuss** (2013-2014)
3. **Alonza Terry Jr.** (2013-2016)
4. **William Balderrama** (2016)
5. **Scott Harman** (since 2020)

Undergraduate students in research projects

1. **Hughes Lu**, Fall 2017
2. **Jiamin Zhong**, Fall 2017
3. **Ziqin Xiong**, Fall 2017, Spring 2018
4. **Ruoyu Meng**, Fall 2017, Spring 2018
5. **Zihe Wang**, Spring 2018
6. **Hongru Yang**, Spring 2018
7. **Iris Tong**, Fall 2018, Spring 2019
8. **Kelly Jezior**, Fall 2018, Spring 2019
9. **Yasir Badillo Acosta**, Fall 2018, Spring 2019
10. **Kagen Quiballo**, Fall 2018, Spring 2019
11. **Alexandra Lehan**, Fall 2018
12. **Erik Hernandez**, Fall 2018
13. **Steve O'Brien**, Fall 2018, Spring 2019

14. **Jack Gentile**, Fall 2018
15. **Eric Ma**, Fall 2018, Spring 2019, Fall 2019, Spring 2020
16. **Haozhe Wang**, Fall 2018
17. **Dagoberto Saenz**, Spring 2019
18. **Reed Oei**, Spring 2019, Fall 2019, Spring 2020
19. **Mihika Poddar**, Spring 2019
20. **Abdullah Nooraldeen**, Fall 2019
21. **Tatum Schmidt**, Fall 2019
22. **Elizabeth Zelenka**, Fall 2019
23. **Tina Kong**, Fall 2019
24. **Daria Chudnovsky**, Fall 2019, Spring 2020
25. **Ian Copple**, Fall 2019, Spring 2020
26. **Jacqueline Ortiz**, Fall 2019
27. **Carolyn Janick**, Spring 2020
28. **Andrew Chong**, Spring 2020
29. **Michael Yun**, Spring 2020

Talks

- 2020 **Practical and Structural Model Theory**, *Passau, Germany*, July 2020.
(cancelled because of COVID-19)
- University of Illinois at Chicago**, *Logic Seminar*, March 2020, Chicago, Illinois.
(cancelled because of COVID-19)
- 2019 **AMS Sectional Meeting**, *Model Theory Special session*, September 2019, Madison, WI.
- SIU Pure Mathematics Conference**, *Carbondale, IL*, May 2019.
- Massachusetts Institute of Technology**, *MIT Electronic Seminar on Mathematics Education*, February 2019.
- 2018 **Workshop on Tame Expansions of O-minimal Structures**, *Konstanz*, October 2018.
- SIAM Conference on Discrete Mathematics**, *Special session on Open Problems in Combinatorics on Words*, June 2018.
- University of Illinois, Department of Computer Science**, *Formal Method Seminar*, June 2018.
- 2017 **Model Theory Conference**, *Bedlewo, Poland*, July 2017.
- AMS Sectional Meeting**, *Model Theory Special session*, May 2017, Hunter College, NY.
- VIG 2017**, *UCLA*, February 2017, Los Angeles, California.
- 2016 **Colloquium Logicum 2016**, *University of Hamburg*, September 2016, Hamburg, Germany.
- Workshop on Model Theory: From Fields to Hardy Fields**, *Fields Institute, Toronto*, August 2016, Canada.

- Summer School in Tame Geometry**, *University of Konstanz*, July 2016, Konstanz, Germany.
- Ohio State University**, *Logic Seminar*, March 2016, Columbus, Ohio.
- University of Illinois at Chicago**, *Logic Seminar*, March 2016, Chicago, Illinois.
- 2015 **McMaster University**, *The Evelyn Nelson Lecture*, December 2015, Hamilton, Ontario.
- McMaster University**, *Logic Seminar*, December 2015, Hamilton, Ontario.
- City University of New York**, *Logic Workshop*, November 2015, New York, NY.
- Future directions in model theory and analytic functions**, *Manchester, UK*, July 2015.
- University of Konstanz**, *Model Theory Seminar*, June 2015, Konstanz, Germany.
- Ohio State University**, *Logic Seminar*, May 2015, Columbus, Ohio.
- University of Wisconsin**, *Southern Wisconsin Logic Colloquium*, April 2015, Madison, Wisconsin.
- University of Münster**, *Colloquium*, March 2015, Münster, Germany.
- 2014 **Canadian Mathematical Society Winter Meeting**, *Model Theory Special session*, December 2014, Hamilton, Ontario.
- Eastern Illinois University**, *Colloquium*, November 2014, Charleston, Illinois.
- University of Illinois at Chicago**, *Logic Seminar*, March 2014, Chicago, Illinois.
- University of California at Los Angeles**, *Logic Colloquium*, January 2014, Los Angeles, California.
- 2013 **University of Notre Dame**, *Logic Seminar*, November 2013, South Bend, Indiana.
- Applications of O-Minimality Workshop**, *Passau, Germany*, September 2013.
- ASL Annual Meeting**, *Model Theory Special session*, May 2013, Waterloo, Ontario.
- ASL Winter Meeting**, *Plenary talk*, January 2013, San Diego, California.
- 2012 **Fields Institute**, *Back 2 Fields Colloquium*, October 2012, Toronto, Ontario.
- McMaster University**, *Logic Seminar*, October 2012, Hamilton, Ontario.
- Western Illinois University**, *Colloquium*, October 2012, Macomb, Illinois.
- University of Konstanz**, *Oberseminar*, May 2012, Konstanz, Germany.
- University of Illinois**, *Colloquium*, January 2012, Urbana, Illinois.
- 2011 **MidWest Model Theory Day**, *Chicago, Illinois*, October 2011.
- O-minimal Structures and Real Analytic Geom. Workshop**, *Fields Institute, Toronto*, August 2011, Canada.
- University of Münster**, *Oberseminar*, June 2011, Münster, Germany.
- MidWest Model Theory Meeting**, *Columbus, Ohio*, May 2011.
- Ohio State University**, *Logic Seminar*, May 2011, Columbus, Ohio.
- University of Notre Dame**, *Colloquium*, February 2011, South Bend, Indiana.
- University of Notre Dame**, *Logic Seminar*, February 2011, South Bend, Indiana.

- 2010 **University of Wisconsin**, *Logic Seminar*, December 2010, Madison, Wisconsin.
Logic Colloquium 2010, *Model Theory Special session*, July 2010, Paris, France.
University of Freiburg, *Oberseminar*, July 2010, Freiburg, Germany.
Ohio State University, *Logic Seminar*, April 2010, Columbus, Ohio.
- 2009 **MidWest Model Theory Meeting**, *Urbana, Illinois*, November 2009.
ESF Research Conference in Model Theory, *Bedlewo, Poland*, August 2009.
Logicum Urbanae Lugduni, *Lyon, France*, July 2009.
Fields Institute, *Geometry and Model Theory Seminar*, May 2009, Toronto, Ontario.
- 2008 **University of Manchester**, *Logic Seminar*, November 2008, Manchester, UK.
University of Oxford, *Logic Seminar*, May 2008, Oxford, UK.
- 2007 **MODNET Research Workshop**, *Berlin, Germany*, September 2007.
- 2006 **University of Amsterdam**, *Colloquium on Mathematical Logic*, April 2006, Amsterdam, Netherlands.

Teaching Experience

- University of Illinois** Lecturer
- Computational tools in Linear Algebra (Math 299, 30 students, Spring 2020)
 - Appl. Linear Algebra (Math 415, 2 × 200 Students, Spring 2020)
 - Appl. Linear Algebra (Math 415, 200 Students, Spring 2019)
 - Definability theory (Math 595, 8 Students, Fall 2019)
 - Appl. Linear Algebra (Math 415, 2 × 200 Students, Fall 2017 *)
 - Appl. Linear Algebra (Math 415, 2 × 200 Students, Fall 2016 *)
 - Appl. Linear Algebra (Math 415, 2 × 200 Students, Fall 2015 *)
 - Appl. Linear Algebra (Math 415, 2 × 200 Students, Fall 2014 *)
 - Appl. Linear Algebra (Math 415, 215 Students, Spring 2014, *)
 - Appl. Linear Algebra (Math 415, 200 Students, Fall 2013, *)
 - O-minimal structures (Math 595, 8 Students, Fall 2013, *)
 - Mathematical Logic (Math 414, 18 Students, Spring 2013)
 - Mathematical Logic (Math 570, 17 Students, Fall 2013, *)
 - Intro Matrix Theory (Math 225, 200 Students, Spring 2012, *)
 - Mathematical Logic (Math 414, 17 Students, Spring 2012, *)
 - Fundamental Math. (Math 347, 25 Students, Fall 2011, *)
 - Intro Matrix Theory (Math 225, 200 Students, Spring 2011)
 - Mathematical Logic (Math 414, 12 Students, Spring 2011)
 - Differential Equations (Math 285, 60 Students, Fall 2010)
- (*) indicates appearance on the 'List of teachers ranked as excellent by their students')
- University of Oxford** Tutor, Undergraduate course in Logic (2007)
Teaching Assistant, Undergraduate course in Logic (2006)
- University of Bonn** Teaching Assistant
- Undergraduate courses in Algebra and Logic (2004–2005)
 - Undergraduate courses in Linear Algebra (2002–2003)

Service

- Referee** Referee for the following journals: Annals of Pure and Applied Logic, Archive of Mathematical Logic, Fundamenta Mathematicae, Israel Journal of Mathematics, Journal of Symbolic Logic, Mathematical Logic Quarterly, Notre Dame Journal of Formal Logic, Proceedings of the American Mathematical Society, Transaction of the American Mathematical Society
- Reviewer** Panelist for the National Science Foundation, Reviewer for the German Academic Exchange Service
- Organizer**
- Organizing Committee, Thematic Program on Tame Geometry, Transseries and Applications to Analysis and Geometry January 1 - June 30, 2022, Fields Institute, Toronto
 - Co-organizer of the Special Session in Model Theory of the 2020 AMS Sectional Meeting in West Lafayette, IN
 - Co-organizer of the Workshop on Tame Expansions of O-minimal Structures in Konstanz 2018
 - Member of the Organizing and Program Committee of the 2015 North American Meeting of the Association of Symbolic Logic
 - Organizer of the Special Session in Model Theory for the 2014 North American Meeting of the Association of Symbolic Logic
- Internal**
- Director, Illinois Geometry Lab (since 2019)
 - Service on various Departmental committees, in particular the Executive Committee (2017-19)
 - Local faculty adviser for the Pi Mu Epsilon Mathematics Honor Society (since 2014)

Outreach

- 2020 **Organizer, A Winter Math Carnival in honor of Julia Robinson, University of Illinois at Urbana-Champaign, USA.**
organized large STEM outreach at the Alice Campbell Alumni Center, reached 500 members of the general public, see [I-STEM report](#).
- 2018– **Director, Illinois Geometry Lab (IGL), University of Illinois at Urbana-Champaign, USA.**
The Illinois Geometry Lab's mission is to enhance and support undergraduate research within the Department of Mathematics and to support departmental efforts to engage local, state and national communities through outreach. See [IGL website](#)
- 2018– **Organizer, Illinois Geometry Lab - University High School cooperation, University of Illinois at Urbana-Champaign, USA.**
lead a cooperation between the IGL and the University Laboratory High School to provide research opportunities to local high school students. As of Summer 2020, over 40 high school students have been participating in 13 research projects. See [I-STEM report](#).
- 2017 **Organizer, A Math Carnival at Illinois, University of Illinois at Urbana-Champaign, USA.**
organized large STEM outreach at the Department of Mathematics, reached over 500 members of the general public, see [I-STEM report](#).

2012-14 **Organizer, Gathering for Gardner**, *University of Illinois at Urbana-Champaign*, USA.

organized large STEM outreach at the Department of Mathematics, reached over 200 members of the general public, see [website](#).