

Gabriel Conant

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Education

- Aug. 2015 **Ph.D. in Pure Mathematics**, *University of Illinois at Chicago*, Chicago, IL.
Thesis: *Model theory and combinatorics of homogeneous metric spaces*
Advisor: David Marker
- May 2010 **MS in Pure Mathematics**, *University of Illinois at Chicago*, Chicago, IL.
- May 2008 **BA in Mathematics**, *Colgate University*, Hamilton, NY.

Employment

- 2019-pres. **Research Associate (postdoc)**, *University of Cambridge*, Cambridge, UK.
supervisor: Timothy Gowers
- 2016-2019 **Lumpkins Postdoctoral Fellow (RAP)**, *University of Notre Dame*, Notre Dame, IN.
supervisor: Anand Pillay
- 2015-2016 **Visiting Assistant Professor**, *University of Notre Dame*, Notre Dame, IN.
supervisor: Anand Pillay

Awards and Grants

- 2019 **NSF Grant DMS-1855503**, *University of Notre Dame*, August 1 2019 to July 31 2022.
Total budget: \$109,074. Upon my moving to Cambridge, Anand Pillay (Notre Dame) became the nominal PI so as to administer the grant for the support of my research.
- 2018 **AMS Simons Travel Grant**, *University of Notre Dame*.
- 2014 **NSF Research Training Group Pre-doctoral Fellow**, *University of Illinois at Chicago*.
I was supported as a graduate student in UIC's RTG program in algebraic geometry and related fields, including number theory, complex dynamics, model theory, and logic.
- 2008 **Edwin J. Downie '33 Award for Mathematics**, *Colgate University*.
Given annually to a senior majoring in mathematics who has made outstanding contributions to the mathematics department through exemplary leadership, service, and achievement.
- 2006 **Sisson Prize in Mathematics**, *Colgate University*.
Awarded to an outstanding sophomore student in mathematics.

Research Interests

Model theory, *expansions of discrete groups, pseudofinite groups, homogeneous structures.*

Applications of model theory to group theory and arithmetic combinatorics, *including arithmetic regularity, approximate groups, and inverse problems for nonabelian groups.*

Publications

- to appear G. Conant, **On finite sets of small tripling or small alternation in arbitrary groups**, accepted to Combinatorics, Probability & Computing.
- to appear G. Conant, A. Pillay, & C. Terry, **Structure and regularity for subsets of groups with finite VC-dimension**, accepted to Journal of the European Mathematical Society.
- to appear G. Conant & A. Pillay, **Pseudofinite groups and VC-dimension**, accepted to Journal of Mathematical Logic.
- 2020 G. Conant & K. Gannon, **Remarks on generic stability in independent theories**, Annals of Pure and Applied Logic 171 (2020), no. 2.
- 2020 G. Conant & M. C. Laskowski, **Weakly minimal groups with a new predicate**, Journal of Mathematical Logic 20 (2020), no. 2.
- 2020 G. Conant, A. Pillay, & C. Terry, **A group version of stable regularity**, Mathematical Proceedings of the Cambridge Philosophical Society 168 (2020), 405-413.
- 2019 G. Conant & A. Kruckman, **Independence in generic incidence structures**, Journal of Symbolic Logic 84 (2019), no. 2, 750-780.
- 2019 G. Conant, **Stability and sparsity in sets of natural numbers**, Israel Journal of Mathematics 230 (2019), no. 1, 471-508.
- 2019 U. Andrews, G. Conant, & I. Goldbring, **Definable sets containing productsets in expansions of groups**, Journal of Group Theory 22 (2019), no. 1, 63-82.
- 2019 G. Conant, **Extending partial isometries of generalized metric spaces**, Fundamenta Mathematicae 244 (2019), no. 1, 1-16.
- 2018 G. Conant, **Multiplicative structure in stable expansions of the group of integers**, Illinois Journal of Mathematics 62 (2019), no. 1-4, 341-364.
- 2018 E. Bering, G. Conant, & J. Gaster, **On the complexity of finite subgraphs of the curve graph**, Osaka Journal of Mathematics 55 (2018), 795-808.
- 2018 G. Conant & A. Pillay, **Stable groups and expansions of $(\mathbb{Z}, +, 0)$** , Fundamenta Mathematicae 242 (2018), no. 3, 267-279.
- 2018 G. Conant, **There are no intermediate structures between the group of integers and Presburger arithmetic**, Journal of Symbolic Logic 83 (2018), no. 1, 187-207.
- 2017 G. Conant, **Forking and dividing in Henson graphs**, Notre Dame Journal of Formal Logic 58 (2017), no. 4, 555-566.
- 2017 G. Conant, **An axiomatic approach to free amalgamation**, Journal of Symbolic Logic 82 (2017), no. 2, 648-671.
- 2017 G. Conant, **Neostability in countable homogeneous metric spaces**, Annals of Pure and Applied Logic 168 (2017), no. 7, 1442-1471.
- 2017 G. Conant, **Distance structures for generalized metric spaces**, Annals of Pure and Applied Logic 168 (2017), no. 3, 622-650.
- 2016 G. Conant, **A remark on strict independence relations**, Archive for Mathematical Logic 55 (2016), no. 3-4, 535-544.
- 2016 G. Conant & C. Terry, **Model theoretic properties of the Urysohn sphere**, Annals of Pure and Applied Logic 167 (2016), no. 1, 49-72.

Submitted preprints

- arXiv 2020 *Approximate subgroups with bounded VC-dimension*, (with A. Pillay) arXiv 2004.05666.
arXiv 2020 *Quantitative structure of stable sets in arbitrary finite groups*, arXiv 2004.02819.
arXiv 2019 *Stability in a group*, arXiv 1902.07194.

Academic Service

- June 2021 **Co-organizer of "Combinatorics meets Model Theory"**, *University of Cambridge*, Cambridge, UK.
- 2016-pres. **AMS MathSciNet Reviewer.**
- 2013-pres. **Webmaster of *forkinganddividing.com*.**
As a resource for students and researchers, I created and maintain a dynamic map of the network of definitions and dividing lines in model-theoretic classification theory.
- Jan. 2019 **Co-organizer of AMS Special Session "Recent advances in regularity lemmas"**, *2019 Joint Mathematics Meetings*, Baltimore, MD.
- April 2017 **Co-organizer of AMS Special Session in Model Theory**, *Spring Central Sectional Meetings, Indiana University*, Bloomington, IN.
- Spring 2016 **Member of Ph.D. thesis defense committee.**
For Somayeh Vojdani (University of Notre Dame, advisor: Anand Pillay)
- 2014-2015 **Co-organizer of the 16th Graduate Student Conference in Logic.**
An annual conference for graduate students presenting thesis research or expository talks.
- 2011-2013 **Co-organizer of the UIC Louise Hay Logic Seminar.**
A weekly graduate student seminar for giving expository and research talks.
- Spring 2013 **Co-organizer of UIC Graduate Student Colloquium.**
A research seminar intended for graduate students in all fields of mathematics.
- Fall 2011 **UIC Teaching Assistant Coordinator.**
Duties: observe and evaluate first-year teaching assistants, and advise throughout the semester.
- 2009-2010 **Co-president of the UIC Mathematics Graduate Student Association.**
Duties: Organize activities for faculty and students in the department.

Selected Invited Talks

- Jan. 2021 **ASL Winter Meeting at JMM**, *Invited Address*, virtual.
- Aug. 2020 **Groups and Model Theory (postponed)**, *Stevens Institute of Technology*, Hoboken, NJ.
- May 2020 **Antalya Algebra Days XXII (postponed)**, *Nesin Mathematics Village*, Izmir, Turkey.
- Jan. 2020 **Model Theory: Groups, Geometries, and Combinatorics**, *Mathematical Research Institute of Oberwolfach*, Oberwolfach, Germany.
- July 2019 **Workshop on Recent Applications of Model Theory**, *Fields Institute*, Toronto, CA.
- June 2019 **Model Theory and Mathematical Logic**, *University of Maryland*, College Park, MD.
- May 2019 **Journées sur les Arithmétiques Faibles**, *CUNY*, New York, NY.
- May 2019 **Pure Mathematics Conference**, *Southern Illinois University*, Carbondale, IL.
- April 2019 **Department Colloquium**, *Vassar College*, Poughkeepsie, NY.
- Feb. 2019 **Department Colloquium**, *Wesleyan University*, Middletown, CT.

- Feb. 2019 **Department Colloquium**, *Iowa State University*, Des Moines, IA.
- Oct. 2018 **Pure and Applied Model Theory**, *University of Illinois*, Chicago, IL.
- Oct. 2018 **Neostability Workshop**, *International Research Station, Casa Matemática Oaxaca*, Oaxaca, Mexico.
- July 2018 **Special Session on Model Theory**, *ASL European Logic Colloquium, University of Udine*, Udine, Italy.
- July 2018 **Ramsey Theory in Logic, Combinatorics, and Complexity**, *Università di Bologna*, Bertinoro, Italy.
- June 2018 **South and East of England Model Theory Network**, *University of Norwich*, Norwich, UK.
- June 2018 **Department Colloquium**, *Hebrew University*, Jerusalem, Israel.
- May 2018 **Combinatorics and Additive Number Theory**, *CUNY*, New York, NY.
- May 2018 **Special Session on Model Theory**, *Association for Symbolic Logic (ASL) North American Annual Meeting, Western Illinois University*, Macomb, IL.
- April 2018 **Model Theory of Finite and Pseudofinite Structures**, *University of Leeds*, Leeds, UK.
- Jan. 2018 **Model Theory and Combinatorics**, *Institut Henri Poincaré*, Paris, France.
- Dec. 2017 **Special Session on Model Theory**, *Canadian Mathematical Society Annual Winter Meeting, University of Waterloo*, Waterloo, Ontario.
- Aug. 2017 **Nonstandard Methods in Combinatorial Number Theory**, *American Institute of Mathematics*, San Jose, CA.
- June 2017 **Model Theory in Wrocław**, *Instytut Matematyczny, Uniwersytet Wrocławski*, Wrocław, Poland.
- July 2016 **Model Theory of Finite and Pseudofinite Structures**, *University of Leeds*, Leeds, UK.
- April 2016 **Graduate Student Conference in Logic**, plenary speaker, *University of Notre Dame*, Notre Dame, IN.
- April 2016 **Midwest Model Theory Day**, *University of Illinois at Chicago*, Chicago, IL.
- Nov. 2015 **Homogeneous Structures Workshop**, *Banff International Research Station*, Banff, AB.
- Oct. 2015 **Special Session on Model Theory**, *AMS Central Fall Sectional Meeting, Loyola University*, Chicago, IL.
- July 2015 **Neostability Workshop**, *International Research Station, Casa Matemática Oaxaca*, Oaxaca, Mexico.
- June 2015 **BLAST**, *University of North Texas*, Denton, TX.

Extended Programs

- Spring 2018 **Model Theory, Combinatorics, and Valued Fields Trimester Program**, *Institute Henri Poincaré*, Paris, France.

Teaching Experience

- 2019-pres. **Research Associate**, *University of Cambridge*, Cambridge, UK.

Model Theory (Part III, examinable): Michaelmas Term 2020

Applications of Pseudofinite Model Theory (graduate, non-examinable): Easter Term 2020

- 2015-2019 **Research Associate Professor**, *University of Notre Dame*, Notre Dame, IN.
MATH 40910 Topics in Mathematical Logic: Spring 2019 (10 students)
MATH 20550 Calculus III: Fall 2015 (36 students), Fall 2016 (66 students), Fall 2017 (64 students)
MATH 10560 Calculus II: Fall 2015 (57 students), Spring 2016 (65 students)
MATH 10250 Elements of Calculus I: Spring 2016 (29 students), Fall 2017 (69 students)
MATH 10360 Calculus B for the Life and Social Sciences: Fall 2018 (43 students)
MATH 10130 Beginning Logic: Fall 2016 (33 students)
MATH 10120 Finite Mathematics: Spring 2017 (27 students)
Undergraduate Summer School, Thematic Program in Model Theory: June 6-10, 2016 (~20 students)
- 2012-2015 **Lecturer (graduate student)**, *University of Illinois*, Chicago, IL.
MATH 300 Writing for Mathematics: Fall 2013, Spring 2014
MATH 210 Calculus 3: Fall 2012
Summer Enrichment Workshop - Math 090 Intermediate Algebra: Summer 2013
- 2008-2013 **Teaching assistant (graduate student)**, *University of Illinois*, Chicago, IL.
MATH 181 Calculus 2, MATH 180 Calculus 1, MATH 160 Finite Math for Business, MATH 121
Precalculus, MATH 090 Intermediate Algebra