

## James E. Hanson

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### CONTACT INFORMATION

Iowa State University  
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### EMPLOYMENT

#### **Iowa State University**

Assistant Professor, Fall 2024 to present

#### **University of Maryland, College Park**

Novikov Postdoctoral Fellow, Fall 2021 to Spring 2024

I was offered a postdoctoral position at the ANR Project AGRUME for Spring 2021 working with Tomás Ibarlucía at the Université de Paris, but the pandemic prevented me from officially accepting the position. Instead, I worked remotely with Ibarlucía on a related research project.

### EDUCATION

#### **University of Wisconsin–Madison**

PhD in Mathematics, December 2020  
MA in Physics, December 2016

#### **University of Minnesota, Twin Cities**

BSc in Mathematics and Physics, May 2012

### RESEARCH INTERESTS

My research interests lie primarily in model theory and in the intersection of logic and real analysis. In the domain of model theory, I am interested in neostability theory and continuous logic. Neostability theory attempts to broaden the applicability of model-theoretic ideas to broader classes of mathematical structures. Continuous logic has applications in analysis, such as ergodic theory and  $C^*$ - and other operator algebras, and in some parts of algebra, such as Berkovich analytic geometry. I am also interested in computable analysis and computable structure theory.

### PUBLICATIONS

1. J. E. HANSON, *Approximate categoricity in continuous logic*. Archive for Mathematical Logic, December 2024, [10.1007/s00153-024-00952-3](https://doi.org/10.1007/s00153-024-00952-3).
2. J. E. HANSON, *Bounded ultraimaginary independence and its total Morley sequences*. Model Theory, April 2024, [10.2140/mt.2024.3.39](https://doi.org/10.2140/mt.2024.3.39).
3. J. HANSON, *Some semilattices of definable sets in continuous logic*. Journal of Logic and Analysis, April 2024. [10.4115/jla.2024.16.3](https://doi.org/10.4115/jla.2024.16.3)
4. J. E. HANSON, *Approximate isomorphism of metric structures*. Mathematical Logic Quarterly, September 2023, [doi.org/10.1002/malq.202200076](https://doi.org/10.1002/malq.202200076).
5. J. HANSON, *Strongly Minimal Sets and Categoricity in Continuous Logic*. [arxiv.org/abs/2011.00610](https://arxiv.org/abs/2011.00610). Accepted at *Memoirs of the AMS*.
6. G. CONANT, K. GANNON, J. HANSON, *Keisler measures in the wild*. Model Theory 2, no. 1 (2023): 1-67. [doi.org/10.2140/mt.2023.2.1](https://doi.org/10.2140/mt.2023.2.1).
7. J. HANSON, T. IBARLUCÍA. *Approximate isomorphism of randomization pairs*. Confluentes Mathematici, Volume 14 (2022) no. 2, pp. 29-44. doi : 10.5802/cml.85.

8. J. HANSON, *Metric spaces are universal for bi-interpretation with metric structures*. Ann. Pure Appl. Logic (2023), doi.org/10.1016/j.apal.2022.103204.
9. G. CONANT, J. HANSON, *Separation for isometric group actions and hyperimaginary independence*. Fundamenta Mathematicae 259 (2022), 97-109, doi.org/10.4064/fm167-2-2022.
10. J. HANSON, *Analog reducibility*. Journal of Logic and Computation, 2021, exab036, doi.org/10.1093/logcom/exab036.
11. W. COTTRELL, J. HANSON, A. HASHIMOTO, A. LOVERIDGE, AND D. PETTENGILL, *Intersecting  $D3$ - $D3'$  brane system at finite temperature*. Phys. Rev. D, 95, 044022 (2017).
12. W. COTTRELL, J. HANSON, AND A. HASHIMOTO, *Dynamics of  $\mathcal{N} = 4$  supersymmetric field theories in  $2 + 1$  dimensions and their gravity dual*. J. High Energ. Phys. 2016, 12.

#### PUBLICATIONS (PREPRINTS)

1. J. HANSON, *Any function I can actually write down is measurable, right?*
2. J. HANSON, *Uniqueness of constructible models in continuous logic*.
3. K. GANNON, J. E. HANSON, *Model theoretic events*. arxiv.org/abs/2402.15709. Submitted.
4. A. BAUER, J. E. HANSON, *The countable reals*. arxiv.org/abs/2404.01256. In preparation.
5. G. CONANT, K. GANNON, J. E. HANSON, *Generic stability, randomizations, and NIP formulas*. arxiv.org/abs/2308.01801. Submitted.
6. J. HANSON, *A simple continuous theory*. arxiv.org/abs/2306.14324. Submitted.
7. J. E. HANSON, *Bi-invariant types, reliably invariant types, and the comb tree property*. arxiv.org/abs/2306.08239. Submitted.
8. J. HANSON, *A metric set theory with a universal set*. arxiv.org/abs/2302.02258. Submitted.
9. J. HANSON, *Topometric characterization of type spaces in continuous logic*. arxiv.org/abs/2106.13261. Submitted.

#### TALKS

##### *Forcing with model-theoretic trees*

- PKU Model Theory Seminar. (November 2024)
- University of Maryland Logic Seminar. (October 2023)

##### *Special coheirs and model-theoretic trees*

- Iowa State University Logic Seminar. (September 2024)
- 2024 AMS Spring Central Sectional Meeting Special Session on Model Theory, University of Wisconsin–Milwaukee. (April 2024)

##### *Independent in arbitrary theories via automorphism groups and large cardinals*

- SEALS 2024, University of Florida. (March 2024)

##### *Tameness and definability in continuous logic*

- Iowa State University. (January 2024)

##### *Generic stability and randomizations*

- Mid-Atlantic Mathematical Logic Seminar Spring Fling 2023. (May 2023)
- Joint Mathematics Meetings. (April 2022)

*How bad could it be? The semilattice of definable sets in continuous logic*

- NYLogic Logic Workshop. (April 2023)
- Wesleyan Logic Colloquium. (November 2022)
- University of Maryland Logic Seminar. (October 2022)

*Bounded ultraimaginary independence*

- 2023 North American Annual Meeting of the ASL. (March 2023)
- UCLA Logic Colloquium. (May 2022)
- University of Maryland Logic Seminar. (February 2022)

*An introduction to continuous logic*

- VCU Analysis, Logic and Physics Seminar. (April 2022)

*Definable sets in continuous logic*

- University of Maryland Logic Seminar. (September 2021)

*A gentle introduction to continuous logic*

- University of Maryland Logic Seminar. (September 2021)

*A Versatile Counterexample for Invariant Types and Keisler Measures outside NIP*

- Notre Dame Model Theory Seminar (Digital). (March 2021)
- Séminaire de Logique Lyon-Paris (Digital). (March 2021)

Joint work with Gabriel Conant and Kyle Gannon.

*Strongly Minimal Sets in Continuous Logic* (regarding essential continuity)

- Online Logic Seminar (Digital). (August 2021)

*Definability and Categoricity in Continuous Logic*

- UW Logic Seminal (Digital), University of Wisconsin-Madison. (April 2020)

*Skolemization in Continuous Logic*

- UW Logic Seminar, University of Wisconsin-Madison. (November 2019)

*Strongly Minimal Sets in Continuous Logic* (regarding categoricity)

- Logic Seminar, University of Illinois at Chicago. (October 2019)
- AMS Sectional Meeting, Special Session on Model Theory, University of Wisconsin-Madison. (September 2019)
- Graduate Student Conference in Logic XX, University of Illinois at Chicago. (April 2019)
- UCI Logic and Set Theory Seminar, University of California, Irvine. (April 2019)
- UW Logic Seminar, University of Wisconsin-Madison. (February 2019)

*Separable and inseparable Gromov-Hausdorff categoricity in continuous logic*

- Association for Symbolic Logic North American Annual Meeting, Western Illinois University. (May 2018)
- Graduate Student Conference in Logic XIX, University of Wisconsin-Madison. (April 2018)

*Encoding metric structures as metric spaces*

- UW Logic Seminar, University of Wisconsin-Madison. (February 2018)

WORKSHOPS	<i>A Convergence of Computable Structure Theory, Analysis, and Randomness</i> , March 19-March 24, 2023, in Banff.
AWARDS	<p>University of Wisconsin-Madison, Department of Mathematics</p> <ul style="list-style-type: none"> <li>• <i>Excellence in Mathematical Research Award</i>, October 2019.</li> <li>• <i>Physical Sciences Award</i>, October 2018.</li> </ul> <p>University of Wisconsin-Madison, Department of Physics</p> <ul style="list-style-type: none"> <li>• <i>Van Vleck Fellowship for Teaching Assistants</i>, September 2012.</li> <li>• <i>David L. Huber Fellowship</i>, September 2012.</li> <li>• <i>Firminhac Fellowship</i>, September 2012.</li> </ul> <p>University of Minnesota</p> <ul style="list-style-type: none"> <li>• <i>Professor Hans H. Dalaker Scholarship for Undergraduate Mathematics</i>, April 2011.</li> <li>• <i>Presidential Scholarship</i>, August 2008.</li> <li>• <i>Maroon and Gold Leadership Award</i>, August 2008.</li> <li>• <i>National Merit Scholarship</i>, August 2008.</li> <li>• <i>Undergraduate Research Scholarship</i>, August 2008.</li> </ul>
ORGANIZATIONAL EXPERIENCE	<p>I run the University of Maryland, College Park, Logic Seminar and have done so since Fall 2021.</p> <p>I helped organize the 19th Graduate Student Conference in Logic which was held at the University of Wisconsin-Madison in April 2018.</p>
OUTREACH	<p>I mentored for the University of Wisconsin-Madison Math Department Directed Reading Program.</p> <p>I volunteered for the University of Wisconsin-Madison Math Circle.</p> <p>I volunteer for the Skype a Scientist program.</p>