

# ELLIOT KAPLAN

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## EMPLOYMENT

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### McMaster University

July 2021 – June 2024

- NSF Postdoctoral Fellow
- Postdoctoral Fellow at the Fields Institute July 2021 – June 2022

## EDUCATION

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### University Illinois at Urbana-Champaign

- Doctorate in mathematics, May 2021
- Dissertation: *Derivations on o-minimal fields*, advised by Lou van den Dries

### Ohio University

- Bachelor of science, Honors Tutorial College, May 2015
- Undergraduate thesis: *Initial embeddings in the surreal number tree*, advised by Philip Ehrlich

## RESEARCH INTERESTS

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Model theory and its applications. Especially o-minimality, valued fields, and differential fields.

## PUBLICATIONS

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| <b><i>T</i>-convex <i>T</i>-differential fields and their immediate extensions</b>                             | 2022+ |
| <i>Pacific J. Math.</i> , to appear. <a href="#">↗</a> <a href="#">📄</a>                                       |       |
| <b>Surreal ordered exponential fields</b>  | 2021  |
| With Philip Ehrlich  |       |
| <i>J. Symb. Log.</i> , 86(3), 1066–1115, 2021. <a href="#">↗</a> <a href="#">📄</a>                             |       |
| <b>Generic derivations on o-minimal structures</b>   | 2021  |
| With Antongiulio Fornasiero  |       |
| <i>J. Math. Log.</i> , 21(2):2150007, 45, 2021. <a href="#">↗</a> <a href="#">📄</a>                            |       |
| <b>Pairs of theories satisfying a Mordell-Lang condition</b>   | 2020  |
| With Alexi Block Gorman and Philipp Hieronymi  |       |
| <i>Fund. Math.</i> , 251(2):131–160, 2020. <a href="#">↗</a> <a href="#">📄</a>                                 |       |
| <b>Distality for the asymptotic couple of the field of logarithmic transseries</b>                             | 2020  |
| With Allen Gehret  |       |
| <i>Notre Dame J. Form. Log.</i> , 61(2):341–361, 2020. <a href="#">↗</a> <a href="#">📄</a>                     |       |
| <b>Continuous regular functions</b>  | 2020  |
| With Alexi Block Gorman, Philipp Hieronymi, Ruoyu Meng, Erik Walsberg, Zihe Wang, Ziqin Xiong, and Hongru Yang |       |
| <i>Log. Methods Comput. Sci.</i> , 16(1):Paper No. 17, 24, 2020. <a href="#">↗</a> <a href="#">📄</a>           |       |
| <b>Logarithmic hyperseries</b>   | 2019  |
| With Lou van den Dries and Joris van der Hoeven  |       |
| <i>Trans. Amer. Math. Soc.</i> , 372(7):5199–5241, 2019. <a href="#">↗</a> <a href="#">📄</a>                   |       |

<b>Number systems with simplicity hierarchies II</b>	2018
With Philip Ehrlich	
<i>J. Symb. Log.</i> , 83(2):617–633, 2018. <a href="#">↗</a> <a href="#">📄</a>	
<b>Resolution depth of positive braids</b>	2015
With David Krcatovich and Patricia O’Brien	
<i>J. Knot Theory Ramifications</i> , 24(14):1550075, 12, 2015. <a href="#">↗</a> <a href="#">📄</a>	

## PREPRINTS

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<b>Hilbert polynomials for finitary matroids</b>	2022
With Antongiulio Fornasiero	
<i>Submitted.</i> <a href="#">↗</a> <a href="#">📄</a>	
<b>Liouville closed <math>H_T</math>-fields</b>	2022
<i>Submitted.</i> <a href="#">↗</a> <a href="#">📄</a>	
<b>Hyperserial fields</b>	2021
With Vincent Bagayoko and Joris van der Hoeven	
<i>Submitted.</i> <a href="#">↗</a> <a href="#">📄</a>	

## AWARDS AND ACHIEVEMENTS

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<b>NSF Mathematical Sciences Postdoctoral Research Fellowship (MSPRF)</b>	2021 – 2024
<b>List of Teachers Ranked as Excellent by Their Students</b>	2015, 2017 – 2020
<b>Kuo-Tsai Chen Prize in Mathematics</b>	2019
<b>Waldemar J., Barbara G., and Juliette Alexandra Trjitzinsky Fellowship</b>	2019
<b>Honorable mention, Graduate Research Fellowship Program</b>	2016
<b>U.S. Junior Oberwolfach Fellows NSF Grant (DMS-1641185)</b>	2016

## INVITED TALKS

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<b>Mathematical Research Institute of Oberwolfach, Germany</b>	November 2022
Mini-Workshop on Topological and Differential Expansions of o-minimal Structures.	
<b>AMS Spring Central Sectional Meeting at Purdue University</b>	April 2020
Model Theory and its Applications Special Session, canceled due to COVID-19.	
<b>North American meeting of the Association of Symbolic Logic at UC Irvine</b>	March 2020
Model Theory Special Session, canceled due to COVID-19.	
<b>Summer Illinois Mathematics Camp at UIUC</b>	July 2018
A discussion of the basics of knot theory aimed at a high school audience.	
<b>Mathematical Research Institute of Oberwolfach, Germany</b>	December 2016
Mini-Workshop on Surreal Numbers, Surreal Analysis, Hahn Fields and Derivations.	
<b>Joint Math Meetings in Seattle, WA</b>	January 2016
Surreal Numbers Special Session.	

## SEMINAR TALKS

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<b>Fields Postdoc Colloquium</b>	April 2022
<b>Geometry and Model Theory Seminar at the Fields Institute</b>	January 2022
<b>Kolchin Seminar in Differential Algebra</b>	October 2021

Model Theory Seminar at the Fields Institute	August 2021
Topological and Differential Expansions of O-minimal Structures Seminar	February 2021
Manchester Logic Seminar	June 2020
Notre Dame Logic Seminar	June 2020
Lyon-Paris Logic Seminar	May 2020
Caltech-UCLA Logic Seminar	February 2020
Logic Seminar at The Ohio State University	November 2019
Graduate Model Theory Seminar at UCLA	January 2018

## CONTRIBUTED TALKS

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Joint Math Meetings in Denver, CO	January 2020
North American meeting of the Association of Symbolic Logic at CUNY	May 2019
XIX Graduate Student Conference in Logic at UW-Madison	April 2018
XVIII Graduate Student Conference in Logic at UIUC	April 2017
North American meeting of the Association of Symbolic Logic at UIUC	March 2015

## TEACHING AND MENTORSHIP EXPERIENCE

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McMaster University	Fall 2022 –
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- Instructor for Engineering Mathematics I (Fall 2022).

University of Illinois at Urbana-Champaign	Fall 2015 – Fall 2020
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- Led discussion sections for Calculus II (Fall 2015, Summer 2020), Calculus III (Fall 2016, Spring 2017, Fall 2018, Fall 2019), and Applied Linear Algebra (Spring 2018, Fall 2020).
- Head teaching assistant for Elementary Linear Algebra (Fall 2017) and Applied Linear Algebra (Spring 2018, Fall 2020).
- Grader for Mathematical Logic (Fall 2016, Fall 2017) and General Topology (Fall 2017).

Preliminary Arizona Winter School (PAWS)	Fall 2022
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*The Southwest Center for Arithmetic Geometry*

Course assistant for Ronnie Nagloo's course *Introduction to model theory with applications*.

Program for Interdisciplinary and Industrial Internships at Illinois	Summer 2019
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*University of Illinois at Urbana-Champaign*

Workshop leader for a three-day workshop on advanced linear algebra topics for graduate students.

Graduate Team Leader	Summer 2019
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*Illinois Geometry Lab*

Led a group of three undergraduate students in a project about three-player combinatorial games.

Graduate Mentor	Spring 2018
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*Illinois Geometry Lab*

Helped lead a group of four undergraduate students in a research project studying functions recognizable by Büchi automata.

## OTHER WORK EXPERIENCE

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- Summer Intern** Summer 2016  
*Wolfram Research*  
Helped develop a way to code theorems from general topology in the Wolfram language.
- Program for Interdisciplinary and Industrial Internships at Illinois** Summer 2015  
*University of Illinois at Urbana-Champaign*  
Researched random matrix pencils as part of an NSF funded research program.
- Lead Mathematics Tutor** August 2014 – May 2015  
*Ohio University Tutoring Services*
- CRLA Certified Mathematics Tutor** February 2012 – May 2015  
*Ohio University Tutoring Services*
- Summer Undergraduate Research Institute in Experimental Mathematics** Summer 2014  
*Michigan State University*

## PROFESSIONAL SERVICE

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- Co-organizer** January 2023  
*ASL Special Session on Tame Geometry and Applications to Analysis at the JMM*
- Co-organizer** Spring 2017, Spring 2021  
*Graduate Student Conference in Logic XVIII and XXII*
- Organizer** Spring 2021  
*Nonstandard Analysis Learning Seminar at UIUC*
- Graduate Student Member** Fall 2019 – Spring 2020  
*UIUC Math Department Undergraduate Affairs Committee*
- Referee:** Algebra and Number Theory.
- Reviewer:** Mathematical Reviews.