

# 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.

## PREPRINTS

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### Hilbert polynomials for finitary matroids

2022

With Antongiulio Fornasiero

*Preprint.* [!\[\]\(1f56542a42e2413e44a2b2023033aa2e\_img.jpg\)](#) [!\[\]\(f68284289fe27ddc7c7b21cde471c330\_img.jpg\)](#)

### Liouville closed $H_T$ -fields

2022

*Submitted.* [!\[\]\(bff896c19919791b89ab521f039b410a\_img.jpg\)](#) [!\[\]\(313b953e922872460aebc4922cab3c35\_img.jpg\)](#)

### $T$ -convex $T$ -differential fields and their immediate extensions

2021

*Submitted.* [!\[\]\(4186b6ce3a1c83eabb297c1bfd00309c\_img.jpg\)](#) [!\[\]\(47d65e2db8884b900589700f5ce09b80\_img.jpg\)](#)

### Hyperserial fields

2021

With Vincent Bagayoko and Joris van der Hoeven

*Submitted.* [!\[\]\(c1b924320d9ec7587a1dd427119524d0\_img.jpg\)](#) [!\[\]\(222fb6e22bad3a71da067dfbd61ee3fb\_img.jpg\)](#)

## PUBLICATIONS

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### Surreal ordered exponential fields

2021

With Philip Ehrlich

*J. Symb. Log.*, 86(3), 1066-1115, 2021. [!\[\]\(5ca7d0bd23567a9aa1f800590644baea\_img.jpg\)](#) [!\[\]\(93a800b136548d380c0cb54631afba93\_img.jpg\)](#)

### Generic derivations on o-minimal structures

2021

With Antongiulio Fornasiero











*J. Math. Log.*, 21(2):2150007, 45, 2021. [!\[\]\(6f570b68c0ee531e594eca882aeed36a\_img.jpg\)](#) [!\[\]\(c4b5194b52bb6c99c098ede6b1658559\_img.jpg\)](#)

### Pairs of theories satisfying a Mordell-Lang condition

2020

With Alexi Block Gorman and Philipp Hieronymi

*Fund. Math.*, 251(2):131-160, 2020. [!\[\]\(a97e5ec31e247abfe5544bdfb2d7a4e9\_img.jpg\)](#) [!\[\]\(87b709bf5a8be2be206cacb82074523b\_img.jpg\)](#)

<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.  	
<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.  	
<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.  	
<b>Number systems with simplicity hierarchies II</b>	2018
With Philip Ehrlich	
<i>J. Symb. Log.</i> , 83(2):617–633, 2018.  	
<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.  	

## 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>Graduate College Conference Travel Award</b>	2016
<b>U.S. Junior Oberwolfach Fellows NSF Grant (DMS-1641185)</b>	2016

## INVITED TALKS

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<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
Undergraduate Mathematics Symposium at UIC	October 2014
Young Mathematicians Conference at Ohio State University	August 2014
MathFest in Portland, OR	August 2014

## WORK EXPERIENCE

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**Teaching Assistant** 2015-2021  
*University of Illinois at Urbana-Champaign*

- 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)
- Facilitated group work, helped students prepare for exams, helped write worksheets and exams.

**Workshop Leader** Summer 2019  
*University of Illinois at Urbana-Champaign*

- Led a three day workshop on advanced linear algebra topics for graduate students.
- Part of the Program for Interdisciplinary and Industrial Internships at Illinois, an NSF funded research program.

**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*

- NSF funded research program.
- Researched random matrix pencils for seven weeks, supervised by a visiting professor.

**Lead Mathematics Tutor**  
*Ohio University Tutoring Services*

August 2014 - May 2015

**CRLA Certified Mathematics Tutor**  
*Ohio University Tutoring Services*

February 2012 - May 2015

**Summer Undergraduate Research Institute in Experimental Mathematics** Summer 2014  
*Michigan State University*

## MENTORSHIP AND PROFESSIONAL SERVICE

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**Co-organizer**  
*Graduate Student Conference in Logic XVIII and XXII*

Spring 2017, Spring 2021

**Graduate Student Member**  
*UIUC Math Department Undergraduate Affairs Committee*

Fall 2019 - Spring 2020

**Graduate Team Leader**  
*Illinois Geometry Lab*

Summer 2019

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

**Graduate Mentor**  
*Illinois Geometry Lab*

Spring 2018

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