

Keita Allen (he/him)

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Education

Massachusetts Institute of Technology, Cambridge, MA
Candidate for Ph.D. in Mathematics, *2023 – Present*.
Interests: Homotopy theory, and its interactions with algebra and geometry.
Advisor: Jeremy Hahn

Massachusetts Institute of Technology, Cambridge, MA
B.S. in Mathematics, *2019 – 2023*.
GPA: 5.0/5.0.

Southland College Prep Charter High School, Richton Park, IL
High school diploma, *2015 – 2019*.

Papers

Synthetic equivariant spectra for finite abelian groups and motivic homotopy theory, with Lucas Piessevaux. [arXiv:2510.20197](https://arxiv.org/abs/2510.20197).

Undergraduate Research
Computing the homology of the motivic lambda algebra, for the University of Chicago REU. Draft available [here](#); supplementary code available [here](#).
Mentored by Mark Behrens and Peter May.

Complexity of computing the homotopy groups of spheres, for MIT UROP+. Draft available [here](#). Mentored by Robert Burklund and Haynes Miller.

Awards and Fellowships

DoD NDSEG Fellowship
2023 – 2026

Charles and Holly Housman Award for Excellence in Teaching
May 2025

MIT Math Teaching and Learning Award
May 2022

Questbridge National College Match Finalist
October 2018

External
Talks

Computing the homology of the \mathbb{C} -motivic lambda algebra
Leadership Alliance National Symposium, *July 2022*

Internal
Talks

The Adams-Novikov spectral sequence in equivariant and motivic homotopy theory

Harvard-MIT Zygotop seminar, *May 2025*

(Formal) groups in topology

MIT PuMaGraSS (Pure Math Graduate Student Seminar), *April 2025*

The Adams spectral sequence and formal groups

Harvard-MIT Babytop seminar, *February 2025*

Real bordism I

Harvard-MIT Babytop seminar, *November 2024*

The Borsuk-Ulam theorem

MIT 18.905 (Algebraic Topology I, covering for instructor), *November 2024*

Synthetic deformations and (equivariant) algebraic geometry

Harvard-MIT Zygotop seminar, *October 2024*

The even filtration

MIT Talbot workshop, *August 2024*

The Galois cohomology of \mathcal{O}_C

Harvard-MIT Babytop seminar, *March 2024*

Formal groups and equivariant homotopy theory

Harvard-MIT Zygotop seminar, *March 2024*

The Hopf condition for bilinear forms

Harvard-MIT Zygotop seminar, *December 2023*

Chromatic homotopy theory and p -divisible groups

Harvard-MIT Babytop seminar, *September 2023*

The lambda algebra in classical and motivic homotopy theory

The University of Chicago REU, *August 2022*

Teaching

Undergraduate TA for 18.02 (multivariable calculus)

Spring 2022

Student evaluations: *Stimulated interest*: 6.8/7.0, *Displayed thorough knowledge of subject material*: 6.9/7.0, *Helped me learn*: 7.0/7.0.

Undergraduate TA for 18.02A (accelerated multivariable calculus)

January 2022

Student evaluations: *Stimulated interest*: 6.7/7.0, *Displayed thorough knowledge of subject material*: 7.0/7.0, *Helped me learn*: 7.0/7.0.

Tutor at MIT Talented Scholars Resource Room (TSR²)

Spring 2021 – Fall 2022

Courses tutored:

18.01/A	<i>single variable calculus</i>	18.02/A	<i>multivariable calculus</i>
18.03	<i>differential equations</i>	18.04	<i>complex variables</i>
18.06	<i>linear algebra</i>	18.600	<i>probability</i>
18.701	<i>abstract algebra I</i>		

Overall rating: 5.0/5.0.

Residential Facilitator for Interphase EDGE

Summer 2021, 2022

TA for course in multivariable calculus, during residential program for rising MIT first-year students from underprivileged backgrounds.

Mentorship

MIT UROP (Undergraduate Research Opportunities Program)

Mentor for MIT undergraduates Ben Osborn and Fatima Nasir Abbasi.

MIT Math DRP (Directed Reading Program)

Mentor for undergraduate reading project.

MIT GUMMI Board Member

Organizer of graduate-undergraduate mentorship pairing program.

Associate Advisor, MIT Office of Minority Education

Fall 2021 – Spring 2023

Service and Organization

Organizer of Harvard-MIT Zygotop Seminar, *Spring 2025 – Fall 2025*

Coorganizer/Webmaster for MIT Topology Seminar, *Spring 2025*

Reporter for Oberwolfach Arbeitsgemeinschaft: Algebraic K-theory and the Telescope Conjecture, *October 2024*

Grader for 18.03 (differential equations), *Spring 2020*