Sanath Devalapurkar

CONTACT
INFORMATION

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EDUCATION

Harvard University, Cambridge, MA
Ph.D. in Mathematics, started in September 2020

Massachusetts Institute of Technology, Cambridge, MA
B.S. in Mathematics, Minor in Physics, May 2020
Coursework available at `https://sanathdevalapurkar.github.io/courses.html`
Overall GPA: 4.9/5.0; math GPA: 5.0/5.0

PUBLICATIONS AND
PREPRINTS

Publications

Roots of unity in $K(n)$-local rings (2017). *Proc. Amer. Math. Soc.* Available at `https://doi.org/10.1090/proc/14960`.

Preprints

Categorifying Hesselholt's HKR theorem (2020). In preparation.

Stacks associated to partially ordered abelian groups (2020). In preparation.

Higher chromatic Thom spectra via unstable homotopy theory (2020). Available at `https://arxiv.org/abs/2004.08951`. Submitted.

On the James and Hilton–Milnor splittings, and the metastable EHP sequence (2019). Joint with Peter Haine. Available at `https://arxiv.org/abs/1912.04130`. Submitted.

Hodge theory for elliptic curves and the Hopf element ν (2019). Available at `https://arxiv.org/abs/1912.02548`. Submitted.

The Ando-Hopkins-Rezk orientation is surjective (2019). Available at `https://arxiv.org/abs/1911.10534`. Submitted.

The Dieudonné modules and Ekedahl-Oort types of Jacobians of hyperelliptic curves in odd characteristic (2017). Joint with John Halliday. Available at `https://arxiv.org/abs/1712.04921`.

The Lubin-Tate stack and Gross-Hopkins duality (2017). Available at `https://arxiv.org/abs/1711.04806`.

BOOKS/LONG
DOCUMENTS

Algebraic topology I (2018). Notes from course taught by Haynes Miller. Published online with the AMS, and on MIT OpenCourseWare.

Algebraic topology II (2018). Notes from course taught by Haynes Miller. Available from `https://sanathdevalapurkar.github.io/files/main2.pdf`.

Talbot Proceedings on obstruction theory for structured ring spectra (2017). Joint with Eva Belmont et. al. Available from the Talbot workshop's webpage at `http://math.mit.edu/conferences/talbot/2017/talbot-notes-2017.pdf`.

2020 — Phi Beta Kappa.
2020 — PD Soros Fellow.
2020 — James Mills Peirce Fellowship, Harvard University.
2016 — Finalist at the Intel Science Talent Search; awarded the Seaborg Award and Student Initiative and Research Report badges.
2015 — First place overall at the European Union Contest for Young Scientists in Italy.
2015 — First place in mathematics at the Intel International Science and Engineering Fair.

TALKS

Globalization I and II (November 2020), talk at the Thursday seminar at Harvard University on condensed math.

TBA (October 2020), talk at Trivial Notions at Harvard University.

Étale fundamental groups (October 2020), talk at the number theory STAGE seminar at MIT on the Weil conjectures.

Splitting cobordism spectra (August 2020), invited talk for the Moscow-Beijing topology seminar at Tsinghua University.

The nonabelian Hodge correspondence (March 2020), for CORONAGS (Corona Outbreak-Response Omnipresent (Noncommutative) Algebraic Geometry Seminar).

The Riemann-Hilbert correspondence, parts I and II (March 2020), two talks for the Mixed Hodge Modules seminar at Harvard.

Representations of Frobenius kernels (March 2020), for the Langlands support group (on modular representation theory) at Harvard.

Loop groups and their representations (December 2019), for Juvitop at MIT.

Hodge theory and topological modular forms (November 2019), for Modular Forms, Arithmetic, and Women in Mathematics at Emory University.

Invariants of manifolds (September 2019), for the MIT Undergraduate Mathematics Association.

The Witten genus and topological modular forms (August 2019), final presentation for the UChicago REU.

Stable splittings of classifying spaces of compact Lie groups (November 2018), for the Thursday seminar at Harvard.

The Morava K-theory of Eilenberg–MacLane spaces I and II (October 2018), two talks for Juvitop at MIT.

$\mathbf{E}_\infty$-*ring structures on Johnson-Wilson theory* (August 2018), final presentation for the MIT SPUR program.

Orientations of derived formal groups (April 2018), for Juvitop at MIT.

An overview of p-adic Hodge theory (February 2018), for a reading seminar on p-adic Hodge theory and THH.

Roots of unity in K(n)-local $\mathbf{E}_\infty$-*rings* (January 2018), at a session on algebraic topology at the Joint Math Meetings in San Diego, California.

Ran a month-long course on chromatic homotopy theory (January 2018). Notes at `sanathdevalapurkar.github.io/files/iap-2018.pdf`.

The Tate-valued Frobenius (December 2017), for a reading seminar on p-adic Hodge theory and THH.

A global perspective on stable homotopy theory (December 2017), for the Kan Seminar at MIT.

The Hitchhiker's Guide to Chromatic Homotopy Theory (November 2017), for a seminar at Harvard on spectral sequences.

Equivariant homotopy theory (November 2017), for a reading seminar on p-adic Hodge theory and THH.

Spectra, $\mathbf{E}_\infty$-rings (October 2017), for a reading seminar on p-adic Hodge theory and THH.

MU, BP, and everything (October 2017), for a seminar at Harvard on spectral sequences.

Examples of Goodwillie towers (October 2017), for Juvitop at MIT.

Milnor's exotic spheres (September 2017), for the Kan Seminar at MIT.

163 and all that (September 2017), at MIT's Student Colloquium for Undergraduates in Mathematics.

Homotopy theory and connections with arithmetic geometry (July 2017), three lectures at Emory University.

EXPERIENCE

University of Chicago REU   Summer 2019
Worked with Professors Mark Behrens and Peter May on unstable homotopy theory and its connections with chromatic homotopy theory, and applications of topological modular forms to differential topology and its connections with Hodge theory.

Undergraduate Research at MIT with Andrew Sutherland   Spring 2019
Worked with Professor Andrew Sutherland on computing gonalities of modular curves to make Merel's bound effective.

SPUR at MIT math department   Summer 2018
Worked with Robert Burklund on constructing an $\mathbf{E}_\infty$-ring structure on height 2 Johnson–Wilson theory.

Undergraduate Research at MIT with Goncalo Tabuada   Spring 2018
Worked with Professor Goncalo Tabuada on a project involving topological Hochschild homology.

Emory University REU   Summer 2017
Worked with Professor David Zureick-Brown on a joint project with John Halliday to explicitly calculate mod p Dieudonné modules of hyperelliptic curves.

CONFERENCES
ATTENDED

MSRI, Introductory Workshop: Higher Categories and Categorification, Berkeley, CA (February 2020).

MSRI, Connections for Women: Higher Categories and Categorification, Berkeley, CA (February 2020).

Joint Math Meetings, Denver, CO (January 2020).

Modular Forms, Arithmetic, and Women in Mathematics, Emory University, Atlanta, GA (November 2019).

Mathematics is a long conversation: a celebration of Barry Mazur, Harvard University, Cambridge, MA (June 2018).

Chromatic Homotopy Theory — Journey to the Frontier, Boulder, CO (May 2018).

Homotopy theory: tools and applications, UIUC (July 2017).

Talbot workshop on obstruction theory for structured ring spectra, Gooding, ID (May 2017).

Mentor for Harvard's Directed Reading Program in math (Fall 2020).

Moderator for Vakil's Foundations Of Algebraic Geometry online "course" (April 2020 – present).

Grader for 6.875/18.425 (graduate cryptography and cryptanalysis), September – December 2019.

Reviewer of a textbook on algebraic topology for the MIT press.

Reviewer of project proposal for the Banff Research institute.

Associate advisor for freshmen, August 2019 – Spring 2020.

Mentor for a high school research project (on the conjugation action on the mod 2 dual Steenrod algebra) via PRIMES-USA, January – November 2018.

The importance of theoretical research (2018). Published in *The Tech*; available at `https://thetech.com/2018/11/01/importance-theoretical-research`.

Vice president of MIT's Undergraduate Math Association (2018–2020).

Grader for 18.A34 (Putnam seminar), September 2017 – December 2017.

Organizer for MIT's Student Colloquium for Undergraduates in Mathematics, 2017 – present.

Active on MathOverflow since 2017; user profile at `https://mathoverflow.net/users/102390/skd`. Also active on MathOverflow's homotopy theory chat.