Elden Elmanto

Harvard University
Department of Mathematics
One Oxford Street
SC 231
MA 02138
United States.

E-MAIL: eldenelmanto@gmail.com
URL: www.eldenelmanto.com

Areas of specialization

Algebraic K-theory and cobordism, motivic cohomology and homotopy, derived and arithmetic algebraic geometry.

Employment

2024	Member, Institute for Advanced Study
2023-	Assistant professor (tenure track), University of Toronto
2021- 2022	ERC Postdoc, IMJ-PRG
2019-2023	Benjamin Peirce fellow, Harvard University.
Spring 2019	MSRI Postdoctoral fellow, Mathematical Sciences Research Institute.
Fall 2018	Postdoctoral fellow, University of Copenhagen.

Education

2018	PhD in Mathematics, Northwestern University.
2013	BS in Mathematics, University of Chicago.

Awards

2029	*NSERC grant Certificate of Teaching Excellence.* Awarded by Derek Bok Center for Teaching and Learning and the Office of Undergraduate Education at Harvard University
2018	*MSRI Postdoctoral fellowship.* Awarded a fellowship grant as a participant to the program "Derived Algebraic Geometry" at Mathematical Sciences Research Institute, Berkeley, California (January-May 2019)
2018	*Northwestern University Department of Mathematics Best Thesis Award.*

2017 *Institut Mittag-Leffler Postdoctoral Fellowship.* Awarded a fellowship grant as a participant to the program "Algebro-Geometric and Homotopical Methods" at Institut Mittag-Leffler, Djursholm, Sweden (January-May 2017)

Visiting appointments

Institut Mittag-Leffler, Djursholm, Sweden. December 2021.

The Centre for Advanced Study (CAS) at the Norwegian Academy of Science and Letters, Oslo, Norway (remote participation).

Mathematical Sciences Research Institute (MSRI), Berkeley, USA. January-June 2019.

Institut Mittag-Leffler, Djursholm, Sweden. January-May 2017.

Universität Duisburg-Essen, Essen, Germany. May-July 2016 (visiting Marc Levine).

Publications

Articles/to appear

T. Bachmann, E. Elmanto, P. A. Østvær, *On étale motivic spectra and Voevodsky's convergence conjecture*, *submitted to appear in J. Eur. Math. Soc.* (2020), `arXiv:2003.04006`.

E. Elmanto, R. Haugseng, *On distributivity in higher algebra I: the universal property of bispans*, *to appear in Compos. Math.* (2020), `arXiv:2010.15722`.

E. Elmanto, G. Kulkarni, M. Wendt, *A^1-connected components of classifying spaces and purity for torsors*, *to appear in Doc. Math.* (2021), `arXiv:2104.06273`.

E. Elmanto, M. Hoyois, R. Iwasa, S. Kelly, *Milnor excision for motivic spectra* (2020), *to appear in J. reine angew. Math. (Crelle)*, `arXiv:2004.12098`.

E. Elmanto, M. Hoyois, A. A. Khan, V. Sosnilo, M. Yakerson, *Motivic infinite loop spaces*, (2017), *to appear in Cambridge J. Math.*, `arXiv:1711.05248`.

E. Elmanto, V. Sosnilo, *Nilpotent extensions of ∞-categories and the cyclotomic trace* (2020), *to appear in Int. Math. Res. Not.*, `arXiv:2010.09155`.

T. Bachmann, E. Elmanto, *Voevodsky's slice conjectures via Hilbert schemes* (2019), *to appear in Alg. Geom.*, `arXiv:1912.01595`.

E. Elmanto, M. Levine, M. Spitzweck, P. A. Østvær, *Algebraic cobordism and étale cohomology* (2017), *to appear in Geom. Top.*; `arXiv:1711.06258`.

T. Bachmann, E. Elmanto, M. Hoyois, A. A. Khan, V. Sosnilo, M. Yakerson, *On the infinite loop spaces of algebraic cobordism and the motivic sphere* (2019), *to appear in Épijournal Géom. Algébrique.*; `arXiv:1911.02262`.

E. Elmanto, J, Shah *Scheiderer motives and equivariant higher topos theory*, Adv. Math. **382** (2021) 107651.; `arXiv:1912:11557`.

B. Antieau, E. Elmanto *Descent for Semiorthogonal Decompositions*, Adv. Math. **380** (2021) 107600.; `arXiv:1912.08970`.

E. Elmanto, M. Hoyois, A. A. Khan, V. Sosnilo, M. Yakerson, *Modules over Algebraic Cobordism*, Forum Math Pi. **8** (2020), e14, 44 pp.-43.; `arXiv:1908.02162`.

E. Elmanto, *THH and TC are (very) far from being homotopy functors*, J. Pure Appl. Algebra. **225** (2021), no. 8., 12. pp.; arXiv:2007.09857.

E. Elmanto, M. Hoyois, R. Iwasa, S. Kelly, *Cdh descent, cdarc descent and Milnor excision*, Math. Ann. (2020), no. 3-4, 1011–1045.; arXiv:2002.11647.

E. Elmanto, M. Hoyois, A. A. Khan, V. Sosnilo, M. Yakerson, *Framed transfers and motivic fundamental classes*, J. Topol. **13** (2020), 460-500.; arXiv:1809.10666.

E. Elmanto, H. Kolderup, *On modules over motivic ring spectra*, Ann. K-Theory. **5** (2020), 327-355.; arXiv:1708.05651.

E. Elmanto, A. A. Khan, *Perfection in motivic homotopy theory*, Proc. Lond. Math. Soc. **120** (2020), no. 1, 28-38.; arXiv:1812.07506.

B. Antieau and E. Elmanto, *A primer for unstable motivic homotopy theory*, Surveys on Recent Developments in Algebraic Geometry, Proc. Sympos. Pure Math. **95** (2017), pp. 305 – 370.; arXiv:1605.00929.

I. Kriz and E. Elmanto *Some nontrivial examples of the Baldwin–Ozsváth–Szabó twisted spectral sequence and Heegaard–Floer homology of branched double covers*, New York J. Math 22 (2016), 363-378.; arXiv:1604.04260.

Preprints

E. Elmanto, D. Nardin, M. Yakerson, *Twisted K-theory in motivic homotopy theory*, *submitted* (2021), arXiv:2110.09203.

T. Bachmann, E. Elmanto, J. Heller, *Motivic colimits and extended powers*, *submitted* (2021), arXiv:2104.01057.

E. Elmanto, D. Nardin, L. Yang, *A descent view on Mitchell's theorem* (2020), arXiv:2008.02821.

T. Bachmann, E. Elmanto, *Notes on motivic infinite loop space theory*, *submitted* (2019), arXiv:1912.06530.

D. Carchedi, E. Elmanto, *Relative étale realizations of motivic spaces and Dwyer-Friedlander K-Theory of noncommutative schemes*, (2018), arXiv:1810.05544.

E. Elmanto *Motivic contractibility of the space of rational Maps (Thesis)*, (2018), available at www.eldenelmanto.com.

Selected Invited Conference Talks

TBD SPP 1786 homotopy theory and algebraic geometry closing conference, Essen, Germany, August 2023.

TBD at Algebraic K-theory, IHES, France, July 2023.

Voevodsky's slice conjectures via prismatic cohomology at Tensor categories, Sydney, Australia, November 2022.

The zero-th slice of one at Motivic Geometry Conference, Oslo, Norway, August 2022.

Cycles sans cycles at Derived Geometry, Centre de Recerca Matemàtica, Barcelona, Spain, June 2022.

Motivic cohomology of schemes at Stacky approach to prismatic cohomology, Michigan, March 2022.

Motivic cohomology of schemes at K-theory, Oberwolfach, Germany, March 2022.

Motivic cohomology of schemes at Cohomology of Varieties, Warsaw, Poland, March 2022.

Power Operations On Normed Motivic Spectra at Institut Mittag-Leffler, Stockholm, Sweden, 09 May 2019.

Motivic Contractibility of the Space of Rational Maps at International Workshop in Algebraic Topology, Shenzhen, China, June 9 2018.

Colloquia

Algebraic cobordism and the Hilbert scheme of points University of California Berkeley, January 24 2022.

Cycles, cobordisms and vector bundles from the motivic viewpoint University of Toronto, January 20 2022.

Cycles, cobordisms and vector bundles from the motivic viewpoint University of Illinois Chicago, January 14 2022.

Cycles, cobordisms and vector bundles from the motivic viewpoint University of Southern California, January 12 2022.

Cycles, cobordisms and vector bundles from the motivic viewpoint University of Minnesota.

Selected invited seminar talks

On lower K-groups, Sydney algebra seminar, November 25 2022.

On the motivic cohomology of schemes, Columbia number theory seminar, April 2 2022.

Weighted methods in algebraic geometry (joint seminar with V. Sosnilo), University of Leiden algebra, geometry and number theory seminar, March 15 2022.

On the motivic cohomology of singular schemes, University of Copenhagen Algebra/Topology seminar, March 11 2022.

Motivic cohomology reimagined, Institut Mittag-Leffler semester on moduli and algebraic cycles, December 07 2021.

The completely decomposed arc topology and motivic applications, Stanford Algebraic Geometry Seminar, August 13 2021.

The completely decomposed arc topology and motivic applications, Chicagoland Topology Seminar, June 8 2021.

Trace methods for algebraic stacks, MIT Topology Seminar, May 17 2021.

A sales pitch of A^1-homotopy theory to geometers, Zürich Moduli Seminar, April 23 2021.

On Real algebraic cycles and equivariant homotopy theory., Tolouse Homotopie en Géométrie Algébrique Seminar, March 16 2021.

Motivic topology and purity for torsors, Motivic Geometry seminar at the CAS (Oslo), March 3 2021.

A report on the framed motivic program, Michigan Algebraic Topology Seminar, October 12 2020.

Descent for semiorthogonal decompositions, Harvard-MIT Algebraic Geometry Seminar, September 8 2020.

Excision results for motivic cohomology, Duke Geometry and Topology Seminar, 13 April 2020.

Compactifying the étale topos, Minnesota Topology Seminar, 28 October 2019.

On the K-theory of Universal Homeomorphisms, MIT Topology Seminar, 07 October 2019.

On the Motivic Sphere Spectrum and Hilbert Schemes at Institute for Basic Science Korea, 05 March 2019.

Spaces of Algebraic Cobordism and Derived Algebraic Geometry at Mathematical Sciences Research Institute, 15 February 2019.

Perfection in Motivic Homotopy Theory at Universität Regensburg, 18 December 2018.

Power Operations on Normed Motivic Spectra at Universitetet i Oslo, 17 October 2018.

Motivic Fundamental Classes and Framed Motives at Institut Fourier Algebraic Geometry Seminar, 8 October 2018.

Motivic Landweber Exact Theories and Étale Cohomology at Freie Universität Berlin Algebraic Geometry Seminar, 19 July 2018.

Infinite Loop Spaces in Algebraic Geometry at University of Chicago Topology Seminar, 28 November 2017.

Infinite Loop Spaces in Algebraic Geometry at USC/UCLA joint Algebraic Geometry Seminar, 12 September 2017.

Motivic Landweber Exact Theories and Étale Cohomology at National University of Singapore Topology Seminar, 16 March 2017.

Service to the profession

Referee for various journals including Adv. Math., Camb. J. Math., Compos. Math., IMRN, JEMS., Proc. Lond. Math. Soc.

Quick opinion for various journals inlcuding Acta. Math., Invent. Math., Forum Pi., J. reine angew. Math. (Crelle).

Reviewer for an NSF grant

Course assistant for Berlin Summer School in Motivic Homotopy Theory (2018).

Organizer (with Benjamin Antieau and Jeremiah Heller) for "Vitamin K_1: Kerz-Strunk-Tamme's Proof of Weibel's Conjecture"; organizer for a "learning-by-doing" style seminar (2018).

Organizer (with Benjamin Antieau, Akhil Mathew and Maria Yakerson) for "electronic Algebraic K-theory seminar (eAKTS)"; organizer of an international online seminar on algebraic K-theory (2020-).

Organizer (with Dan Isaksen) of an AMS special session at the Joint Mathematics Meeting (2023).

Service to the department

Graduate admissions committee at Harvard (2019-20, 2020-21 cycles).

Co-organizer of the "Open Neighborhood Seminar" at Harvard University, an undergraduate colloqium, 2020.

Organizer of the "Thursday Seminar" at Harvard University: *Motivic Infinite Loop Spaces*, 2018 and *Condensed Mathematics*, 2020.

Organizer of the Graduate Learning Seminar at Købehavns Universitet. Topic: *p-adic Hodge Theory*, 2018.

Organizer of the Algebraic K-Theory Learning Seminar at Northwestern University. Topic: *Topological Cyclic Homology*, 2017.

Organizer of the Algebraic K-Theory Learning Seminar at Northwestern University. Topic: *Rotation Invariance in Algebraic K-Theory*, 2016.

Mentor for the "Buddy Program" at Northwestern University. Helped incoming graduate students with adjusting to graduate student life, 2015-2016.

Advising

Thomas Jacob (M2 at Sorbonne): M2 mémoire on rigidity and the qfh-topology.

Matthew Lipman (undergraduate at Harvard): undergraduate thesis on prismatic cohomology.

Tristan Yang (undergraduate at Harvard): undergraduate thesis on algebraic K-theory and redshift (forthcoming paper: effective chromatic redshift).

Dhilan Lahoti (PhD at Harvard): joint adivising with Mike Hopkins (expected 2027).

Teaching

Harvard University

2019 Linear algebra (proof based, undergraduate), fall semester, instructor.

2019 Reading class with Lucy Chen (Harvard graduate student): algebraic K-theory, fall semester.

2020 Algebraic cobordism (graduate topics class), spring semester, instructor.

2020 Linear algebra and differential equations (computational, undergraduate), fall semester, instructor.

2020 Algebraic geometry I, (graduate) fall semester, instructor.

2021 Algebraic geometry II (graduate), spring semester, instructor.

2021 Derived categories in algebra and geometry (undergraduate), spring semester, instructor.

2022 Motives in p (graduate topics class), fall semester, instructor.

2023 Lie groups and Lie algebras (graduate), spring semester, instructor.

University of Copenhagen

2018 Topics in Topology (with Lars Hesselholt), fall semester, teaching assistant.

Northwestern University

2016 Abstract algebra-I, fall quarter, teaching assistant.

2016 Differential geometry, fall quarter, teaching assistant.

2015 Abstract algebra-I, fall quarter, teaching assistant.

2015 Differential calculus, fall quarter, teaching assistant.

2015 Abstract algebra-III, spring quarter, teaching assistant.

2015 Graduate commutative algebra, spring quarter, teaching assistant.

2015 Abstract algebra-II, winter quarter, teaching assistant.

2015 Linear algebra, winter quarter, teaching assistant.

2014 Abstract algebra-I, fall quarter, teaching assistant.

2014 Differential calculus, fall quarter, teaching assistant.

External Mathematics Outreach

2011 Young Scholar's Program (advanced math program for high school students), summer, teaching assistant, ran by Paul J. Sally Jr.

2012 Collegiate Scholar's Program (advanced math program for high school students), summer, teaching assistant, ran by Paul J. Sally Jr.

2013 SESAME Program (certification program for middle school mathematics teachers), summer, teaching assistant, ran by Paul J. Sally Jr.