

NARUKI MASUDA

<https://nmasuda2.github.io>

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RESEARCH INTERESTS

Homotopy theory, Higher categories and categorification. Some keywords are (∞, ∞) -categories, Categorical spectra, Derived algebraic geometry, Algebraic K -theory, Noncommutative algebraic geometry, Functorial quantum field theory, Higher topos theory, Absolute algebraic geometry.

ACADEMIC POSITIONS

Universität Hamburg *October 2024 - present*
Postdoctoral researcher at CRC 1624: Higher structures, moduli spaces and integrability

EDUCATION

Johns Hopkins University *September 2018 - August 2024*
Ph.D. in Mathematics
Advisor: David Gepner

Université Sorbonne Paris Nord *September 2017 - November 2017*
Visitor
Host/Advisor: Bruno Vallette

The University of Tokyo *April 2014 - March 2018*
B.S. in Mathematics
Advisor: Takuya Sakasai

PAPERS AND PREPRINTS

N. Masuda, *The Algebra of Categorical Spectra*, Ph.D. Thesis.

T. Kinjo, N. Masuda, *Global critical chart for local Calabi-Yau threefolds*, 2023, International Mathematics Research Notices, rnad135.

N. Masuda, H. Thomas, A. Tonks, B. Vallette, *The diagonal of the associahedra*, 2021, Journal de l'École polytechnique — Mathématiques, Volume 8 (2021), pp. 121-146.

FELLOWSHIPS AND AWARDS

The Owen Scholars Fellowship (Johns Hopkins University) *2018-2020*
Study and Visit Abroad Program (University of Tokyo) *March 2017*
Silver medal, the 54th International Mathematical Olympiad *July 2013*

TEACHING

Johns Hopkins University

- Teaching Assistant
 - Calculus III *Spring 2022, Fall 2023 (head TA)*
 - Introduction to Abstract Algebra *Spring 2020*
 - Elementary Number Theory *Spring 2020*

- Calculus II *Fall 2019, Fall 2020, Spring 2021, Fall 2021 (head TA)*
- Methods of Complex Analysis *Fall 2018*
- Honors Linear Algebra *Fall 2020*
- Directed Reading Program Mentorship
 - Introduction to Homotopy Theory *Spring 2020*
- Algebra Qualifying Exam Review Sessions *Spring 2020, Summer 2021, Spring 2023*

Miscellaneous

- Lecturer at Kawai-Juku *2014-2018*
 Supplementary school for middle- and high- school students: materials include highschool mathematics, calculus, linear algebra, problem solving, sheaves and cohomology, general topology, functional analysis, discrete geometry, manifolds, differential geometry, elementary number theory, elliptic curves, singular homology, homotopy theory.
- Math tutor at Scientific Education Group (SEG) *2014-2017*
- Tutor/Trainer at Japan Mathematical Olympiad Foundation *2014-2018*

SERVICE

- Seminar Organizer** *Spring 2023*
 Prismatic Cohomology Learning Seminar
- Seminar Coorganizer** *Fall 2022-*
 Johns Hopkins Topology Seminar
- Workshop Coorganizer** *September 2017*
 Summer Workshop on Spectral Sequences, Shinshu University, Japan
- Japan Team Observer** *September 2016*
 57th International Mathematical Olympiad at Hong Kong
- Summer Camp Organizer** *August 2015*
 One-week intensive learning seminar on a chosen book by small groups of highschool students, organized by Japan Mathematical Olympiad Foundation

RESEARCH TALKS

- Research Seminar on Quantum Topology and Categorification** *November 2024*
 Universität Hamburg, Germany
 Stability of categorical spectra and an application to TQFT
- Kochi Autumn Workshop on Stable homotopy theory** *September 2024*
 Kochi University of Technology, Japan
 Categorical spectra and the Stability
- (∞, n) -categories and their applications** *April 2024*
 Utrecht University, Netherlands
 Tensor product of categorical spectra and the Spanier-Whitehead duality
- Algebraic Topology Seminar** *February 2024*
 Chicago University, USA
 Categorical spectra and their tensor product
- Algebra/Topology Seminar** *January 2024*
 University of Copenhagen, Denmark
 Categorical spectra and their tensor product

Number Theory and Representation Theory Seminar University of Maryland, USA Categorical spectra and higher Galois theory	<i>December 2023</i>
Topology Seminar Northwestern University, USA Tensor product of categorical spectra and applications	<i>November 2023</i>
TGTS Tetrahedral Geometry/Topology Seminar Elizabethtown College, USA Tensor product of categorical spectra: The first step towards higher ² algebra	<i>September 2023</i>
Kochi homotopy theory workshop Kochi University, Japan Tensor product of categorical spectra	<i>December 2022</i>
UPenn Deformation Theory Seminar University of Pennsylvania, USA The diagonal of the associahedra	<i>November 2021</i>

EXPOSITORY PRESENTATIONS

Yatsugatake Workshop on Chromatic Homotopy Theory Kobuchizawa, Japan Chromatic localizations of spectra	<i>September 2024</i>
Factorization Algebras and Related Topics Hakone, Japan An Introduction to (∞, n) -categories	<i>August 2024</i>
Analytic Stacks Learning Seminar Six functor formalism and the $!$ -topology Johns Hopkins University, USA	<i>April 2024</i>
Ambidexterity Learning Seminar Johns Hopkins University, USA Dieudonne Modules	<i>October 2023</i>
Prismatic Cohomology Learning Seminar Johns Hopkins University, USA TC^- and TP of perfectoid rings, Nygaard filtration	<i>April 2023</i>
TQFT Learning Seminar Johns Hopkins University, USA Tangle Hypothesis	<i>April 2023</i>
Prismatic Cohomology Learning Seminar Johns Hopkins University, USA Hodge-Tate comparison	<i>March 2023</i>
Goodwillie Calculus Learning Seminar Johns Hopkins University, USA Higher Excision and Analytic Functors	<i>October 2022</i>
Number Theory Learning Seminar Johns Hopkins University, USA A Short Course in Higher Algebra	<i>September-October 2021</i>
Category Theory Seminar Johns Hopkins University, USA Stable Category Theory(??) and Absolute Algebra(???)	<i>December 2021</i>
Number Theory Learning Seminar	<i>April 2021</i>

Johns Hopkins University, USA “Serre–Tate local moduli” by Katz	
Oral exam	<i>March 2021</i>
Johns Hopkins University, USA “Towards Derived Absolute Algebraic Geometry”	
Number Theory Learning Seminar	<i>December 2020</i>
Johns Hopkins University, USA “Relèvements modulo p^2 et decomposition du complexe de de Rham” by Deline–Illusie	
eKan Seminar	<i>November 2019</i>
Online “Algebraic K-theory and Etale Cohomology” by Thomason	
Category Theory Seminar	<i>October 2019</i>
Johns Hopkins University, USA Geometric Morphisms	
Category Theory Seminar	<i>April 2019</i>
Johns Hopkins University, USA Initial Algebras and Free Monads (from “Infinity Operads as Analytic Monads” by Gepner, Haugseng, Kock)	
Category Theory Seminar	<i>February 2019</i>
Johns Hopkins University, USA Bar-cobar and Koszul duality for algebraic operads II	
Category Theory Seminar	<i>December 2018</i>
Johns Hopkins University, USA Bar-cobar and Koszul duality for algebraic operads I	
Fifth Spring School on Algebraic Topology in Shinshu	<i>March 2017</i>
Shinshu University, Japan Infinity Categories	
Fourth Spring School on Algebraic Topology in Shinshu	<i>March 2016</i>
Shinshu University, Japan Loop Spaces and A_∞ -spaces	

CONFERENCES AND WORKSHOPS ATTENDED

Workshop on “Unstable Homotopy Theory”	<i>November 2024</i>
Max Planck Institute for Mathematics, Germany	
Kochi Autumn Workshop on Stable homotopy theory and Related topics	<i>September 2024</i>
Kochi University of Technology, Japan	
Yatsugatake Workshop on Chromatic Homotopy Theory	<i>September 2024</i>
Kobuchizawa, Japan	
Factorization Algebras and Related Topics	<i>August 2024</i>
Hakone, Japan	
Masterclass on Continuous K-theory, dualizable and rigid categories	<i>June 2024</i>
University of Copenhagen, Denmark	
(∞, n)-categories and their applications	<i>April 2024</i>
Utrecht University, Netherlands	
Recent Advances in Algebraic K-theory	<i>July 2023</i>
IHES, France	

Homotopy Theory in honor of Paul Goerss Northwestern University, USA	<i>March 2023</i>
Arithmetic geometry, cycles, Hodge theory, regulators, periods and heights Isaac Newton Institute, UK	<i>June 2022</i>
Barcelona Conference on Higher Structures Universitat de Barcelona, Spain	<i>June 2022</i>
Workshop on Derived Geometry Centre de Recerca Matemàtica (CRM), Spain	<i>June 2022</i>
Homotopical Methods in Geometry and Physics Northwestern University, USA	<i>March 2022</i>
Category Theory Octoberfest Johns Hopkins University, USA	<i>October 2019</i>
Riemann-Roch in characteristic one and related topics Johns Hopkins University, USA	<i>September 2019</i>
IWoAT 2019 and Summer School on Equivariant Homotopy Theory Shanghai Center for Mathematical Sciences, China	<i>August 2019</i>
Young Topologists Meeting École polytechnique fédérale de Lausanne, Switzerland	<i>July 2019</i>
The fifth European Talbot Workshop Rheinböllen, Germany	<i>July 2019</i>
Workshop on Functor Calculus Ohio State University, USA	<i>March 2019</i>
Higher Structures Centre International de Rencontres Mathématiques, France	<i>January 2019</i>
Vladimir Voevodsky Memorial Conference Institute of Advanced Study, USA	<i>October 2018</i>
Rigidity and Algebraic Models in Stable Homotopy Theory University of Copenhagen, Denmark	<i>April 2018</i>
Geometry and Combinatorics of Associativity Hamilton Mathematics Institute, Trinity College Dublin, Ireland	<i>October 2017</i>
Colloque du GDR de Topologie Algébrique Paris Diderot University, France	<i>October 2017</i>
Workshop on Motivic and Equivariant Homotopy Theory University of Osnabrück, Germany	<i>October 2017</i>
Categories in Homotopy Theory and Rewriting Centre International de Rencontres Mathématiques, France	<i>September 2017</i>
Summer Workshop on Spectral Sequences Shinshu University, Japan	<i>September 2017</i>
Homotopy Theory: Tools and Applications University of Illinois at Urbana-Champaign, USA	<i>July 2017</i>
Summer School on Floer Homology and Homotopy Theory University of California at Los Angeles, USA	<i>July 2017</i>
The fifth Spring School on Algebraic Topology on factorization homology Shinshu University, Japan	<i>March 2017</i>
The fourth Spring School on Algebraic Topology on operads	<i>March 2016</i>

Shinshu University, Japan

The third Spring School on Algebraic Topology on infinity categories
Shinshu University, Japan

March 2015