BRADLEY DIRKS

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POSITIONS

Institute for Advanced Study 2024-2025
Member, School of Mathematics *Princeton, NJ*

Stony Brook University 2023-2027
Simons Instructor *Stony Brook, NY*

NSF Mathematical Sciences Postdoctoral Research Fellow 2023-2027
Stony Brook University *Stony Brook, NY*

EDUCATION

University of Michigan 2018-2023
PhD in Mathematics. Advisor: Mircea Mustaţă *Ann Arbor, MI*
  - Thesis: Using Mixed Hodge Modules to Study Singularities

University of California 2014-2018
BA and MA in Mathematics *Los Angeles, CA*

TEACHING EXPERIENCE

Instructor Spring 2024
Stony Brook University *Stony Brook, NY*
  - MAT310: Linear Algebra

Graduate Student Instructor October 2018-Winter 2022
University of Michigan *Ann Arbor, MI*
  - Math 105 (Precalculus), Math 115 (Calculus I), Math 116 (Calculus II)

Docent 2016 - 2018
LA Math Circle (now ORMC) *Los Angeles, CA*

RESEARCH INTERESTS

Algebraic Geometry, Singularities, $\mathcal{D}$-modules, Hodge Theory

PREPRINTS

- **Hirzebruch-Milnor classes of local complete intersections, minimal exponent, and applications to higher singularities**
  with Laurenţiu Maxim and Sebastián Olano

- **A Hodge theoretic generalization of Q-homology manifolds**
  with Sebastián Olano and Debaditya Raychaudhury. Submitted

- **Restrictions of Hodge modules using generalized V-filtrations**
  with Qianyu Chen and Sebastián Olano. Submitted

- **Fourier transform and Radon transform for mixed Hodge modules**
  Submitted

- **Some applications of Microlocalization for LCI subvarieties**
  Submitted

- **Verdier specialization and restrictions of Hodge modules**
  w/ Qianyu Chen and Morihiko Saito. Submitted

PUBLICATIONS

- **The minimal exponent of cones over smooth complete intersection projective varieties**
  w/ Qianyu Chen and Mircea Mustaţă. To appear in Revue Roumaine Math. Pures Appl.

- **The minimal exponent and k-rationality for locally complete intersections**
  w/ Qianyu Chen and Mircea Mustaţă. Journal de l'École Polytechnique **11**(2024)

- **Minimal exponents and V-filtrations of locally complete intersection singularities**
  w/ Qianyu Chen, Mircea Mustaţă and Sebastián Olano. Crelle's journal **811**(2024)

- **An introduction to V-filtrations**
  with Qianyu Chen and Mircea Mustaţă. Handbook of Geometry and Topology of Singularities, Volume VII

- **On V-filtration, Hodge filtration and Fourier Transform**
  with Qianyu Chen. Selecta Mathematica (New Series) **29**(2023)

- **Minimal exponents of hyperplane sections: a conjecture of Teissier**
  with Mircea Mustaţă. J. Eur. Math. Soc. **25** (2023)

- **The Hilbert series of Hodge ideals of hyperplane arrangements**
  with Mircea Mustaţă. Journal of Singularities **20** (2020)

- **Upper bounds for roots of B-functions, following Kashiwara and Lichtin**
  with Mircea Mustaţă. Publ. Res. Inst. Math. Sci. **58** (2022)

ORGANIZING

AIM Workshop "Higher Du Bois and higher rational singularities"	October 28 - November 1, 2024
American Institute of Mathematics. See website	*w/ Radu Laza*
Winter School on New Applications of Mixed Hodge Modules	January 2024
Simons Center for Geometry and Physics. See website	*w/ Christian Schnell*
Student Algebraic Geometry seminar	Winter 2021-2023
University of Michigan	*w/ Devlin Mallory in Winter 2021, w/ Saket Shah 2022-2023*
$\mathcal{D}$-modules and Representation Theory Minicourse	Summer 2022
University of Michigan	
Mixed Hodge Theory Minicourse	Summer 2020
University of Michigan	*w/ James Hotchkiss*
Variations of Hodge Structure Reading Group	Winter 2020
University of Michigan	*w/ James Hotchkiss*

INVITED TALKS

JHU Algebraic Geometry Seminar	October 2024
Minimal Exponent for LCI Subvarieties	*Johns Hopkins University*
Princeton University Algebraic Geometry Seminar	September 2024
Minimal Exponent for LCI Subvarieties	*Princeton University*
Birational Geometry Seminar 2024	May 2024
Recent Results on Minimal Exponent for LCI Subvarieties	*Online*
CUNY Commutative Algebra and Algebraic Geometry Seminar	March 2024
The minimal exponent for LCI subvarieties	*Graduate Center of CUNY*
University of Utah Algebraic Geometry Seminar	February 2024
The minimal exponent for LCI subvarieties	*University of Utah*
Columbia University Algebraic Geometry Seminar	January 2024
The minimal exponent for LCI subvarieties	*Columbia University*
Winter School on New Applications of Mixed Hodge Modules	January 2024
V-filtration and Hodge filtration in higher codimension	*Simons Center for Geometry and Physics*
University of Toronto Algebraic Geometry Seminar	November 2023
The minimal exponent for LCI subvarieties	*University of Toronto*
Harvard/MIT Algebraic Geometry Seminar	October 2023
The minimal exponent for LCI Subvarieties	*Harvard University*

Birational Geometry Seminar 2023   May 2023
Higher du Bois and higher rational singularities for LCI varieties   *Online*

MAGGC   August 2022
V-filtrations of $\mathcal{D}$-modules   *UIC*

Algebraic Geometry and Singularities Learning Workshop & Conference   June 2022
Comparing V-filtration of an ideal with that of a general linear combination *UW Seattle*

Algebraic Geometry Seminar   February 2022
The Structure of Monodromic Mixed Hodge modules   *Stony Brook University*

DOCAS Seminar   August 2021
Understanding the roots of b-functions   *Online*

UConn Algebra Seminar   April 2021
Minimal Exponents and a Conjecture of Teissier   *Online*

Topology and Singularities Seminar in Madison   March 2021
Minimal Exponents and a Conjecture of Teissier   *Online*

Awards

NSF Mathematical Sciences Postdoctoral Research Fellowship   National Science Foundation, 2023

Wirt and Mary Cornwell Prize   University of Michigan Mathematics Department, 2023

Rackham Predoctoral Fellowship   University of Michigan, Summer 2022-Winter 2023

Paul Daus Memorial Award   UCLA, 2018

Departmental Honors   UCLA Math Department, 2018

Summa Cum Laude   UCLA, 2018