

András Cristian Lőrincz

CONTACT INFORMATION

University of Oklahoma

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RESEARCH INTERESTS

Algebraic geometry, representation theory, commutative algebra.

POSITIONS

2022–present Assistant Professor, University of Oklahoma
2020–2022 BMS Dirichlet Postdoctoral Fellow, Humboldt–Universität zu Berlin
2019–2020 Postdoctoral Researcher, Max Planck Institute for Math. in the Sciences
2016–2019 Golomb Visiting Assistant Professor, Purdue University, Dep. of Math.

EDUCATION

University of Connecticut, USA

Ph.D. Mathematics, 2014–2016

- Thesis: “Bernstein–Sato polynomials for quivers”
- Advisor: Jerzy Weyman

Northeastern University, USA

Ph.D. student, 2012–2013 (transferred to the University of Connecticut)

M.Sc. Mathematics, 2010–2012

Babeş-Bolyai University, Romania

B.Sc. Mathematics, 2007–2010

- Thesis: “Derived Morita-type equivalences and tilting theory”
- Advisor: Andrei Mărcuş

PUBLICATION LIST Published & accepted papers:

1. *Equivariant D -modules on $2 \times 2 \times n$ hypermatrices* (with M. Perlman), arXiv:2309.07697, Transactions of the American Mathematical Society, accepted.
2. *Borel–Moore homology of determinantal varieties* (with C. Raicu), arXiv:2110.08197, Algebraic Geometry, accepted.
3. *On the collapsing of homogeneous bundles in arbitrary characteristic*, Annales Scientifiques de l’École Normale Supérieure 56: 1313–1337 (2023).
4. *Holonomic functions and prehomogeneous spaces*, Selecta Mathematica 29:69 (2023).
5. *Local cohomology on a subexceptional series of representations* (with J. Weyman), Annales de l’Institut Fourier 73: 747–782 (2023).
6. *Local Euler obstructions for determinantal varieties* (with C. Raicu), Topology and its Applications 313: Paper No. 107984, 21 pp (2022).

7. *Representation varieties of algebras with nodes* (with R. Kinser), Journal of the Institute of Mathematics of Jussieu 21: 2215-2245 (2022).
8. *Minimal free resolutions of ideals of minors associated to pairs of matrices*, Proceedings of the American Mathematical Society 149: 1857-1873 (2021).
9. *Iterated local cohomology and Lyubeznik numbers for determinantal rings* (with C. Raicu), Algebra & Number Theory 14: 2533-2569 (2020).
10. *Equivariant D -modules on alternating senary 3-tensors* (with M. Perlman), Nagoya Mathematical Journal 243: 61-82 (2021).
11. *Algebraic Analysis on Rotation Data* (with M. F. Adamer, A.-L. Sattelberger, B. Sturmfels), Algebraic Statistics 11: 189-211 (2020).
12. *On categories of equivariant D -modules* (with U. Walther), Advances in Mathematics 351: 429-478 (2019).
13. *Decompositions of Bernstein–Sato polynomials and slices*, Transformation Groups 25: 577-607 (2020).
14. *Free resolutions of orbit closures of Dynkin quivers* (with J. Weyman), Transactions of the American Mathematical Society 372: 2715-2734 (2019).
15. *Equivariant D -modules on binary cubic forms* (with C. Raicu, J. Weyman), Communications in Algebra 47: 2457-2487 (issue in honor of G. Lyubeznik) (2019).
16. *Singularities of zero sets of semi-invariants for quivers*, Journal of Commutative Algebra 13: 361-380 (2021).
17. *Bernstein–Sato polynomials for maximal minors and sub-maximal Pfaffians* (with C. Raicu, U. Walther, J. Weyman), Advances in Mathematics 307: 224-252 (2017).
18. *The b -functions of semi-invariants of quivers*, Journal of Algebra 482: 346-364 (2017).

Preprints:

19. *Archimedean zeta functions, singularities, and Hodge theory* (with D. Davis, R. Yang) arXiv:2412.07849.
20. *Singularities of orthogonal and symplectic determinantal varieties*, arXiv:2311.07549.
21. *Nearby and vanishing cycles for the generic determinantal hypersurfaces* (with R. Yang), preprint.

SERVICES

- Organizer, Southwest Local Algebra Meeting, University of Oklahoma, February 2024.
- Organizer, special session on “Group Actions in Commutative Algebra”, JMM San Francisco, January 2024.
- Graduate Committee member at OU, 2022–2024.
- Organizer, OU Math Day, 2022, 2023 (chair), 2024 (chair).
- Organizer, Putnam Seminar, 2022–2024.
- Postdoctoral representative of the MATH+ Board and the Berlin Mathematical School, 2020–2022.
- Organizer, BMS – BGSMATH Junior Meeting, Barcelona, September 2021 (postponed).
- Organizer, learning seminar on “Nakajima quiver varieties and Kac’s conjecture”, University of Connecticut, May 2015.

TEACHING
EXPERIENCE

- Fall 2024 Commutative Algebra, University of Oklahoma.
 Fall 2024 Differential and Integral Calculus III, University of Oklahoma.
 Spring 2024 Lie Theory II, University of Oklahoma.
 Spring 2024 Differential and Integral Calculus II (Honors), University of Oklahoma.
 Fall 2023 Lie Theory I, University of Oklahoma.
 Spring 2023 Algebraic Analysis (Literacy Course), University of Oklahoma.
 Spring 2023 Calculus and Analytic Geometry III, University of Oklahoma.
 Spring 2023 Discrete Mathematical Structures, University of Oklahoma.
 Fall 2022 Calculus and Analytic Geometry IV, University of Oklahoma.
 Summer 2021 Representation Theory, Humboldt–Universität zu Berlin.
 Spring 2019 Elementary Linear Algebra, Purdue University.
 Fall 2018 Linear Algebra, Purdue University.
 Summer 2018 Elementary Linear Algebra, Purdue University.
 Spring 2018 Linear Algebra, Purdue University.
 Fall 2017 Linear Algebra, Purdue University.
 Summer 2017 Linear Algebra (partially online), Purdue University.
 Spring 2017 Linear Algebra, Purdue University.
 Fall 2016 Linear Algebra and Differential Equations, Purdue University.
 Fall 2015 Teaching Assistant, Calculus II, University of Connecticut.
 Spring 2015 Teaching Assistant, Mathematics for Business and Economics, University of Connecticut.
 Spring 2014 Teaching Assistant, Calculus II, University of Connecticut.
 Fall 2013 Teaching Assistant, Differential Equations and Linear Algebra for Engineering, Northeastern University.
 Spring 2013 Math Fundamentals for Games, Northeastern University.
 Fall 2012 Teaching Assistant, Differential Equations and Linear Algebra for Engineering, Northeastern University.
 Spring 2012 Teaching Assistant, Differential Equations and Linear Algebra for Engineering, Northeastern University.
 Fall 2011 Teaching Assistant, Differential Equations and Linear Algebra for Engineering, Northeastern University.
 Spring 2011 Mathematical Thinking, Northeastern University.
 Fall 2010 Mathematical Thinking, Northeastern University.

INVITED TALKS

- Singularities of orthogonal and symplectic determinantal varieties*, AMS Sectional Meeting, Special Session on Homological Commutative Algebra, University of Texas–San Antonio, September 2024.
Singularities of orthogonal and symplectic determinantal varieties, Combinatorial and Commutative Algebra Seminar, Oklahoma State University, April 2024.
Singularities of orthogonal and symplectic determinantal varieties, Algebra and Representation Theory Seminar, University of Oklahoma, April 2024.
On the collapsing of homogeneous bundles in arbitrary characteristic, AMS Sectional Meeting, Special Session on Commutative Algebra, Differential Operators, and Singu-

larities, Creighton University, Omaha, October 2023.

Local cohomology supported at determinantal varieties, Algebra and Representation Theory Seminar, University of Oklahoma, April 2023.

On the collapsing of homogeneous bundles, Algebraic Geometry and Commutative Algebra Seminar, University of Notre Dame, March 2023.

On the collapsing of homogeneous bundles, Commutative Algebra Seminar, University of Illinois Chicago, March 2023.

Borel–Moore homology of determinantal varieties, Geometry and Topology Seminar, University of Oklahoma, February 2023.

Borel–Moore homology of determinantal varieties, CAAG seminar, University of Minnesota, November 2022.

On the collapsing of homogeneous bundles, Algebra and Representation Theory Seminar, University of Oklahoma, September 2022.

On the collapsing of homogeneous bundles in arbitrary characteristic, Algebra and Algebraic Geometry Seminar, Paderborn University, June 2022.

On the collapsing of homogeneous bundles in arbitrary characteristic, Conference on Representation Theory and Geometry, Queen’s University & Royal Military College of Canada, February 2022 .

Algebraic analysis and applications, Mathematics Department Colloquium, University of Oklahoma, December 2021.

Computing with equivariant D -modules, D -modules, Group Actions, and Frobenius: Computing on Singularities, ICERM, August 2021.

On the collapsing of homogeneous bundles in arbitrary characteristic, IMPANGA 20: A Conference on Schubert Varieties, Banach Center in Będlewo, July 2021.

Algebraic analysis and applications, Mathematics Department Colloquium, Paderborn University, April 2021.

Holonomic functions and equivariant D -modules, Number Theory and Algebraic Geometry Seminar, KU Leuven, February 2021.

Holonomic functions and prehomogeneous spaces, Algebra Seminar, Jagiellonian University, February 2021.

Free resolutions of orbit closures of Dynkin quivers, Workshop on Free Resolutions and Representation Theory, ICERM, August 2020.

Algebraic analysis of rotation data, International Congress on Mathematical Software, TU Braunschweig, July 2020.

Equivariant D -modules, Algebraic Geometry Seminar, Humboldt-Universität zu Berlin, June 2020.

Equivariant D -modules, Algebra Seminar, Jagiellonian University, March 2020.

Local cohomology modules on a class of representations, Algebraic Geometry Seminar of Barcelona, University of Barcelona, February 2020.

Algebraic analysis and applications, Mathematics Department Colloquium, UMass Boston, February 2020.

Categories of equivariant perverse sheaves, Conference on Hyperplane Arrangements and Singularities, University of Tokyo, December 2019.

Holonomic functions on prehomogeneous vector spaces, Seminar on the Thematic Einstein Semester on Algebraic Geometry, Berlin, November 2019.

Weyl closure, Seminar on Computing with D -modules II, Max Planck Institute MiS,

September 2019.

Equivariant D -modules on varieties with finitely many orbits, Conference on Representation Theory and Integrable Systems, Zürich, August 2019.

How to compute? Part 1: D -Macaulay, Seminar on Computing with D -modules, Max Planck Institute MiS, August 2019.

D -modules on varieties with finitely many orbits, Summer Seminar, Max Planck Institute MiS, July 2019.

Equivariant D -modules on varieties with finitely many orbits, Algebraic Geometry Seminar, University of California, Davis, May 2019.

D -modules and applications, Mathematics Department Colloquium, University of Windsor, March 2019.

Iterated local cohomology groups and Lyubeznik numbers for determinantal rings, Joint Mathematics Meetings, Special Session on Recent Advances in Homological and Commutative Algebra, Baltimore, January 2019.

Representation varieties of algebras with nodes, Conference on Geometric Methods in Representation Theory, University of Iowa, November 2018.

Iterated local cohomology groups and Lyubeznik numbers for determinantal rings, Conference on Commutative Algebra and Representation Theory, Tulane University, November 2018.

Iterated local cohomology groups and Lyubeznik numbers for determinantal rings, Commutative Algebra Seminar, Purdue University, October 2018.

Equivariant D -modules and applications, Algebra Seminar, University of Connecticut, October 2018.

Iterated local cohomology groups for determinantal rings, AMS Sectional Meeting, Special Session on Commutative Algebra, University of Delaware, September 2018.

On categories of equivariant D -modules, Algebraic Geometry and Commutative Algebra Seminar, University of Notre Dame, April 2018.

Free resolutions of orbit closures of Dynkin quivers, Algebra Seminar, University of Iowa, April 2018.

Bernstein-Sato polynomials, Mathematics Department Colloquium, Delaware State University, March 2018.

On categories of equivariant D -modules, Algebraic Geometry Seminar, Purdue University, February 2018.

Bernstein-Sato polynomials for maximal minors, Algebraic Geometry Seminar, University of Illinois at Urbana-Champaign, March 2017.

Free resolutions of orbit closures of Dynkin quivers, Conference on Geometric Methods in Representation Theory, University of Missouri, November 2016.

Free resolutions of orbit closures of Dynkin quivers, Algebraic Geometry and Commutative Algebra Seminar, University of Notre Dame, January 2016.

Resolutions of orbit closures of Dynkin quivers, Algebra Seminar, University of Connecticut, December 2015.

Bernstein-Sato polynomials for semi-invariants of quivers, International Conference on Representation Theory and Commutative Algebra, University of Connecticut, April 2015.

Bernstein-Sato polynomials for semi-invariants of quivers, Algebra/Topology Seminar, University at Albany, November 2014.

Bernstein-Sato polynomials for semi-invariants of quivers, Algebra Seminar, Univer-

sity of Connecticut, April 2014.

The b-functions of quiver semi-invariants, Conference on Geometric Methods in Representation Theory, University of Missouri, November 2013.

The b-functions of quiver semi-invariants, Brandeis-Northeastern Cluster Seminar, Northeastern University, November 2013.

AWARDS AND
FELLOWSHIPS

- Michael Neumann Award for Best Thesis, University of Connecticut, Spring 2016
- Spring Doctoral Dissertation Fellowship, University of Connecticut, Spring 2016
- Predoctoral Fellowship, University of Connecticut, Spring 2016.
- Predoctoral Summer Fellowship, University of Connecticut, Summer 2014.
- Summer Semester Fellowship, Universität Duisburg–Essen, Summer 2013.
- Summer Semester Fellowship, Universität Duisburg–Essen, Summer 2011.
- Performance Scholarship for Research in Representation Theory of Associative Algebras, Babeş-Bolyai University, 2009-2010.
- Third Prize, 15th International Mathematics Competition for University Students, Blagoevgrad, 2008.

LANGUAGES

Hungarian (native), Romanian (native), English (fluent), German (intermediate), Polish (beginner).

PROGRAMMING
LANGUAGES

Matlab, Macaulay2, Mathematica, C++