Aurel Mihai Fulger

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Research interests

I am interested in algebraic geometry and related areas. I focus on positivity questions.

Employment

2023–present **University of Connecticut**, Associate Professor

2017–2023 **University of Connecticut**, Assistant Professor

2016–2017 **École Polytechnique Fédérale de Lausanne**, Lecturer (post-doc), mentor: Zsolt Patakfalvi

2012–2016 **Princeton University**, Instructor of Mathematics (post-doc), mentor: János Kollár

2007–present **IMAR**, Research Assistant, on leave with no pay

2006–2007 **IMAR**, Junior Research Assistant

Education

2012 Ph.D., University of Michigan, Thesis: Local volumes, Advisor: Robert Lazarsfeld

2007 M.S., **SNSB**, Romania; Advisor: Marian Aprodu

2006 B.S., University of Bucharest, Romania; Senior thesis advisor: Alexandru Gica

Grants and other Honors

2018–2023 Simons Collaboration grant

2019 "*Simion Stoilow*" prize of the Romanian Academy, awarded for work published in 2017 on Numerical Cycle Classes in Algebraic Geometry.

2014 Junior faculty teaching award, Princeton University

2012 Allen Shields Memorial Fellowship, University of Michigan

2007–2009 Rackham Graduate Fellowship, University of Michigan

Accepted Papers

1. (with T. Murayama) *New constructions of nef classes on self-products of curves*, Math. Z. 302 (2022), no. 2, 1239–1265

2. (with A. Langer) *Positivity vs. slope-semistability for bundles with vanishing discriminant*, J. Algebra 609 (2022), 657–687,
https://doi.org/10.1016/j.jalgebra.2022.07.014.,
https://www.sciencedirect.com/science/article/pii/S0021869322003490

3. (with T. Murayama) *Seshadri constants for vector bundles*, J. Pure Appl. Algebra 225 (2021), no. 4, Paper No. 106559, 35 pp.

4. *Seshadri constants for curve classes*, Int. Math. Res. Not. IMRN 2021, no. 21, 16446—16493

5. *Cones of positive vector bundles*, Rev. Roumaine MATH. Pures Appl. 65 (2020), 3, 285–302, in collection: honorary volume dedicated to Vasile Brînzănescu on the occasion of his 75th birthday

6. *Positivity for numerical cycle classes*, Bull. Math. Soc. Sci. Math. Roumanie 60 (108) (2017), no. 4, 399–415, in collection: honorary volume dedicated to Dorin Popescu on the occasion of his 70th birthday

7. (with B. Lehmann) *Zariski decompositions of numerical cycle classes*, J. Algebraic Geom. 26 (2017), no. 1, 43–106

8. (with B. Lehmann) *Positive cones of dual cycle classes*, Algebr. Geom. 4 (2017), no. 1, 1–28

9. (with B. Lehmann) *Kernels of numerical pushforwards*, Adv. Geom. 17 (2017), no. 3, 373–378

10. (with J. Kollár and B. Lehmann) *Volume and Hilbert function of $\mathbf{R}$-divisors*, Michigan Math. J. 65 (2016), no. 2, 371–387

11. (with B. Lehmann) *Morphisms and faces of pseudo-effective cones*, Proc. Lond. Math. Soc. (3) 112 (2016), no. 4, 651–676

12. (with D. Schmitz) *Newton–Okounkov bodies and complexity functions*, C. R. Math. Acad. Sci. Paris 354 (2016), no. 5, 522–525

13. (with X. Zhou) *Asymptotic Schur decomposition of Veronese syzygy functors*, Math. Ann. **362** (2015), no. 1–2, 529–540

14. *Local volumes on normal algebraic varieties*, Ann. Inst. Fourier (Grenoble) **63** (2013), no. 5, 1793–1847

15. *The cones of effective cycles on projective bundles over curves*, Math.Z. **269** (2011), no. 1–2, 449–459

16. (with M. Marchitan) *Some splitting criteria on Hirzebruch surfaces*, Bull. Math. Soc. Sci. Math. Roumaine (N.S.) **54 (102)** (2011), no. 4, 313–323

IN PREPARATION

1. (with T. Murayama) Moving Seshadri constants for bundles.

2. (with V. Lozovanu) Newton–Okounkov bodies on some threefolds

LECTURE SERIES 2021 Workshop for Young Researchers in Mathematics, organized by IMAR, IMOM, and the Mathematics Department of the Ovidius University, Constanta, Romania, on Zoom

2020 Special Session on Geometry and Arithmetic of Algebraic Varieties within the AMS sectional meeting online (formerly at Penn State University) (October)

	2019 Mini-workshop on Seshadri constants, Oberwolfach (November)
	2019 Congress of the Romanian Mathematicians, Galaţi, Romania
	2019 National School of Algebra, Bucharest, Romania
	2018 Positivity in Algebraic Geometry, Yonsei University, Seoul, Korea
	2018 Special session on convex bodies in Algebraic Geometry and Representation Theory within the AMS central sectional meeting in Columbus, OH
	2018 Valley Geometry Seminar, University of Massachusetts Amherst
	2017 Algebraic Geometry near Boston conference, Boston College
	2017 Commutative Algebra meeting Algebraic Geometry: Dorin Popescu's 70th birthday
	2017 Workshop on Positivity in algebraic and complex geometry, ICMS, Edinburgh
	2016 AIM workshop on the Positivity of cycles
	2016 Workshop on Positivity of higher (co)dimensional numerical cycle classes, University of Illinois at Chicago, http://kftucker.people.uic.edu/cycles/
	2016 Anniversary conference celebrating 120 years of CNMB, Constanţa, Romania
	2014 Special session on Algebraic Geometry within the AMS joint meetings in Baltimore
	2013 Special session on Algebraic Geometry within the joint international meetings of the AMS and the RMS in Alba Iulia, Romania
	2012 Special session on singularities in Commutative Algebra and Algebraic Geometry within the AMS central sectional meetings, Lawrence, Texas
	2010 School on birational geometry and moduli spaces, Salt Lake City
COLLOQUIUM TALKS	Queen's University (2016), University of Connecticut (2016), University of Warwick (2016)
SEMINAR TALKS	University of California Riverside (2022); University of Connecticut (2022, 2021, 2020, 2017); Institute of Mathematics of the Romanian Academy (2022); Ovidius University, Constanţa, Romania (2022, 2015); University of Arkansas (2021); Harvard University (2019); Central Michigan University (2019); Northwestern University (2018); University of Chicago (2018); University of Massachusetts Amherst (2018); Princeton University (2018, 2013, 2012); Leibniz University in Hannover (2018); École Polytechnique de Paris (2017); University of Edinburgh (2017); University of Basel (2017); Boston College (2015); World Wide Center of Math., Cambridge (2015); University of Notre Dame (2015,2014); IMJ-PRG, Paris 6, 7 and ENS joint seminar, Paris (2015); Ohio State University (2014); Purdue University (2014); Institute for Advanced Studies, Princeton (2014); University of Illinois at Chicago (2014); University of Illinois at Urbana–Champaign (2014); University of Michigan (2014); Rice University (2013,2012); Johns Hopkins University (2012); University of Utah (2011)

PH.D ADVISING	Benjamin Oltsik, Han Zhou

MENTORING	2023	Reading course on Commutative Algebra with Logan Borghi
	2021	Reading course on Algebraic Geometry with Matthew Trainor
	2019	Working project on Kobayashi hyperbolicity with Gunhee Cho
	2019	Reading course on Algebraic Geometry with Robert Argus
	2018–2019	Informal course on Topics in Algebraic Geometry
	2018	Problems in Scheme Theory with Garen Chiloyan, Gunhee Cho, and Nha Truong
	2017	Problems in Algebraic Geometry with Gunhee Cho
	2015	Undergraduate senior thesis adviser for Conner Jager, Princeton
	2015, 2013	Undergraduate junior project adviser for Horia Mania and Bumsoo Kim, Princeton
	2014	Supervised an undergraduate reading course with Monica Marinescu

CONFERENCE AND WORKSHOP ORGANIZATION	2017	Co-organized a mini-workshop on Positivity in Higher-dimensional Geometry: Higher-codimensional Cycles and Newton–Okounkov Bodies, Oberwolfach (September)
	2017	Co-organized an AIM workshop on Positivity of cycles (August)

OTHER SERVICE	2023-present	Picnic Committee Chair in the Department of Mathematics at UConn
	2022-present	Internal grant reviewer for UConn's Research Excellence Program
	2019-present	Organizer of the Algebra Seminar at the UConn
	2021-present	Co-organized a Seminar on Diversity in Mentoring with Anastasiia Minenkova and Veronique Bazier-Matte
	2017-present	Serving in the student test training committee (including Putnam preparation and Putnam contest organization at UConn)
	2018-present	Member of the committee for the oral examination of Gunhee Cho, Garen Chiloyan at UConn
	2018	Grading coordinator for the International Mathematical Olympiad in Cluj-Napoca, Romania
	2012–2016	Co-organizer of the Princeton University Algebraic Geometry seminar, Princeton
	2015, 2013	Course coordinator for Linear Algebra MAT202 and Calculus II MAT104, Princeton
	2011	Co-organizer of the OSU/UIC/UM Algebraic Geometry workshop

| REFEREEING | Duke Math. Journal, J. Reine Angew. Math, Advances in Math., Algebra and Number Theory, IMRN, Proceedings of the London Mathematical Society, European Journal of Mathematics, Documenta Mathematica, Math. Z., Proc. Amer. Math. Soc., Journal of Algebra, Journal of Pure and Applied Algebra, Annales de la Faculté des Sciences de Toulouse, Communications in Algebra, Kyoto Journal of Mathematics |

TEACHING
EXPERIENCE

University of Connecticut

- Math1131Q: Calculus I — F23, S18
- Math2210Q: Applied Linear Algebra — S21
- Math3210: Abstract Linear Algebra — S22, S20
- Math3230: Abstract Algebra I — F23, S23, F20, F18
- Math3231: Abstract Algebra II — S21
- Math5211: Abstract Algebra II — S19
- Math5020: Commutative Algebra — F21, F19
- Math5321: Algebraic Geometry I — S22, S20, F17
- Math5321: Algebraic Geometry II — F22, S18
- Math5020: Representation Theory — S23

EPFL

- MAT-438: Commutative Algebra — Fall 2016

Princeton University

- **MAT104**: Calculus II — Fall 2015
- **MAT202**: Linear Algebra — Spring 2015,2013; Fall 2013,2012
- **MAT217**: Honors Linear Algebra — Spring 2016
- **MAT447**: Commutative Algebra — Fall 2014
- **MAT457**: Algebraic Geometry — Spring 2014

University of Michigan

- **Math116**: Calculus II — Winter 2011
- **Math115**: Calculus I — Fall 2009
- **Math105**: Pre-Calculus — Fall 2008

MEMBERSHIPS   2021-present Mentor within the MΔth Alliance.

2019-present Member of the Association for Women in Mathematics.