

# ALENA PIRUTKA

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Courant Institute of Mathematical Sciences  
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## POSITIONS

Courant Institute, NYU, Associate Professor, from September 2017  
Courant Institute, NYU, Assistant Professor, 2015-2017  
CNRS, Chargé de Recherche, 2012-2015 (at IRMA, Strasbourg University, 2012-2013, and at CMLS  
École Polytechnique, Paris, from September 2013)  
IRMA, Strasbourg University, postdoctoral fellow, 2011-2012

## EDUCATION

### Habilitation

Université Paris-Sud, Orsay, December 2016  
Title : "Invariants birationnels, cycles algébriques et rationalité."

### Ph.D. in Mathematics

Université Paris-Sud, Orsay, October 2011  
Dissertation topic: "Deux contributions à l'arithmétique des variétés : R-équivalence et cohomologie non ramifiée."  
Adviser: Jean-Louis Colliot-Thélène

### Master in Mathematics, "Algebra and Geometry"

Université Paris 6, 2008  
Master thesis: "Cycles évanescents sur des schémas formels."  
Adviser: Joseph Ayoub

### Mathematics, undergraduate

École Normale Supérieure, Paris, undergraduate fellowship "Sélection Internationale", 2005-2008

### Applied Mathematics and Computer Science

Belarusian State University, Minsk, 2002-2005

## GRANTS AND FELLOWSHIPS

National Science Foundation Grant 1601680 (PI): March 1, 2016 - February 28, 2019  
National Science Foundation Grant 2201195 (PI): April 15, 2022 - March 31, 2025

## HONORS AND AWARDS

International Mathematics Competitions for University Students 2004, 2005 and 2006 (Second Prize, First Prize and Second Prize)  
International Mathematical Olympiad 2002, Bronze medalist

## PUBLICATIONS AND PREPRINTS

1. *Cohomologie non ramifiée en degré trois d'une variété de Severi-Brauer*, C. R. Acad. Sci. Paris, Ser. I **349** (2011), 369–373.
2. *Sur le groupe de Chow de codimension deux des variétés sur les corps finis*, Algebra and Number Theory **5-6** (2011), 803–817.
3. *R-équivalence sur les familles de variétés rationnelles et méthode de la descente*, J. de Théorie des Nombres de Bordeaux **24**, no. 2, (2012), 461–473.
4. *R-equivalence on low degree complete intersections*, J. of Algebraic Geom. **21** (2012), 707–719.
5. *Invariants birationnels dans la suite spectrale de Bloch-Ogus*, J. of K-theory **10** (2012), 565–582.
6. *A bound to kill the ramification over function fields*, J. Algebra **377** (2013), 173–178.
7. (with F. Charles), *La conjecture de Tate entière pour les cubiques de dimension quatre sur un corps fini*, Compositio Mathematica **151**, no. 2, (2015), 253–264.
8. (with N. Yagita), *Note on the counterexamples for the integral Tate conjecture over finite fields*, Documenta Math. Extra Volume: Alexander S. Merkurjev's Sixtieth Birthday, (2015), 501–511.
9. *Sur la cohomologie non ramifiée en degré trois d'un produit*, Bulletin de la SMF **144**, 1 (2016), 53–75.
10. (with J.-L. Colliot-Thélène), *Hypersurfaces quartiques de dimension 3 : non rationalité stable*, Ann. Sci. Ecole Norm. Sup. (2) **49** (2016), 371–397.
11. (with J.-L. Colliot-Thélène), *Cyclic covers that are not stably rational*, (2015), Izvestiya RAN, Ser. Mat. **80**, 4 (2016), 35–47.
12. (with F. Bogomolov and A. Silberstein), *Families of disjoint divisors on varieties*, European Journal of Mathematics, **2**, 4 (2016), 917–928.
13. *On a local-global principle for  $H^3$  of function fields of surfaces over a finite field*, In: A. Auel, B. Hassett, A. Várilly-Alvarado, B. Viray, Brauer Groups and Obstruction Problems. Progress in Mathematics **320**, Birkhäuser Basel, 2017.
14. (with B. Hassett and Y. Tschinkel), *Intersections of three quadrics in  $P^7$* , Surveys in Differential Geometry, **22**(1), 259–274, (2017).
15. *Varieties that are not stably rational, zero-cycles and unramified cohomology*, in Algebraic Geometry (Salt Lake City, UT, 2015), Proc. Sympos. Pure Math., **97**, 459–484. Amer. Math. Soc., Providence, RI, 2018.
16. (with B. Hassett and Y. Tschinkel), *Stable rationality of quadric surface bundles over surfaces*, Acta Mathematica, **220**, (2018), 341–365.
17. (with A. Auel and C. Böhning), *Stable rationality of quadric and cubic surface bundle fourfolds*, European Journal of Mathematics (2018), 1–29.
18. (with J.-L. Colliot-Thélène), *Troisième groupe de cohomologie non ramifiée d'un solide cubique sur un corps de fonctions d'une variable*, Epijournal de géométrie algébrique (EPIGA), volume 2, article no.13 (2018).
19. (with B. Hassett and Y. Tschinkel), *A very general quartic double fourfold is not stably rational*, Algebraic Geometry, **6**(1), 64–75, (2019).
20. (with A. Auel, C. Böhning and H-C. von Bothmer), *Conic bundles over rational threefolds with nontrivial unramified Brauer group*, J. Algebraic Geom. **29** (2020), no. 2, 285–327
21. (with A. Cadoret), *Reconstructing function fields from Milnor K-theory*, Algebra Number Theory **15** (2021), no. 9, 2261–2288.

22. (with F. Bogomolov and C. Böhning) *On stable cohomology of central extensions of elementary abelian groups*, In: Ahmadinezhad, H. and Kasprzyk, A. and Mori, S., (eds.) London Mathematical Society. Lecture Note Series. Cambridge University Press (2021).
23. (with F.Charles) *Finitude uniforme pour les cycles de codimension 2 sur les corps de nombres*, to appear in Trends in Mathematics, a book in memory of Alberto Collino (2022).
24. *Cubic surface bundles and the Brauer group*, (2023).

## SEMINAR AND CONFERENCE TALKS

*Algebraic geometry seminar*, Dartmouth College, October 2023  
*Arithmetic Algebraic Geometry Conference, in memory of Jan Nekovář*, IHES, October 2023  
*Algebraic geometry seminar*, University of California San Diego, April 2023  
*Algebraic geometry seminar*, University of Ferrara, March 2023  
*Birational complexity of algebraic varieties conference*, Stony Brook, December 2022  
*MMP and moduli conference*, Simons Foundation, October 2022  
*Advances in Algebra and Applications conference*, Minsk, June 2022  
*Algebraic K-theory workshop*, Oberwolfach, May 2022  
*Stony Brook Algebraic Geometry seminar*, March 2022  
*Rutgers Number Theory seminar*, March 2022  
*ZAG online seminar*, February 2022  
*qflag.org online seminar*, November 2021  
*Hodge Theory and Rationality*, Virtual Conference, IMSA Miami, October 2020  
*Algebraic Geometry Seminar*, University of Wisconsin-Madison, April 2018  
*Conference on Birational Geometry*, Simons Foundation, New York, August 2017  
*Inaugural conference for Laboratory of Mirror Symmetry and Automorphic forms*, Moscow, HSE, June 2017  
*Emory Conference on Higher Obstructions to Rational Points*, Emory University, Atlanta, May 2017  
*Conference on Geometry and Topology, In Celebration of the 50th Anniversary of the Journal of Differential Geometry*, Harvard University, April-May 2017  
*Yale Algebraic and Tropical Geometry seminar*, Yale University, April 2017  
*Algebra Seminar*, University of Pennsylvania, Philadelphia, April, 2017.  
*Algebro-Geometric and Homotopical Methods*, Research Program, Institut Mittag-Leffler, Stockholm, February 2017  
*ANR Gatho Conference*, IHP Paris, December 2016  
*Columbia University*, New York, Algebraic geometry seminar, December 2016  
*University of Illinois*, Chicago, Algebraic geometry seminar, November 2016  
*Stony brook University*, Stony brook, Algebraic geometry seminar, October 2016  
*University of Michigan*, Michigan, Algebraic geometry seminar, October 2016  
*Northeastern University*, Boston, Algebraic geometry seminar, October 2016  
*Washington University*, Saint Louis, Colloquim, September 2016  
*Levico terme*, Geometria delle Varietà Algebriche, June 2016  
*Edinburgh*, Edge Days, June 2016  
*Simons symposium "Geometry over non-closed fields"*, Ellmau, April 2016  
*Yale University*, AGNES meeting, April 2016  
*Rice University*, Algebraic Geometry seminar, March 2016  
*Jussieu, Paris*, "Autour des cycles algébriques", December 2015  
*Brown University*, Algebraic Geometry seminar, November 2015  
*Emory University, Atlanta*, GAGS meeting, October 2015  
*University of Washington*, WAGS meeting, October 2015  
*CIRM, Luminy*, Méthodes cohomologiques dans la théorie des groupes algébriques, September 2015  
*Salt Lake City*, AMS Summer Institute in Algebraic Geometry, July 2015  
*Saint Petersburg*, Arithmetic geometry, Chow groups and rational points, June 2015  
*CIRM, Luminy*, Arithmétique, Géométrie, Cryptographie et Théorie des Codes, May 2015  
*Stony Brook University*, New Techniques in Birational Geometry, April 2015

*University of Chicago*, Algebraic Geometry seminar, April 2015  
*Simons symposium "Geometry over non-closed fields"*, Puerto Rico, April 2015  
*Arizona Winter School*, Exercise sessions, March 2015  
*Princeton, IAS*, Chow groups, motives and derived categories, March 2015  
*Université Paris-Sud, Orsay*, SAGA seminar, December 2014  
*Essen, Germany*, Algebraic Geometry seminar, November 2014  
*Harvard, Cambridge*, Number Theory seminar, October 2014  
*MIT, Cambridge*, Algebraic Geometry seminar, October 2014  
*University of Pennsylvania*, Galois seminar, October 2014  
*Yale University*, Algebra and Lie Groups seminar, October 2014  
*CUNY, New York*, New York Joint Number Theory Seminar, October 2014  
*Courant Institute, New York*, Algebraic Geometry seminar, October 2014  
*Mainz University*, conference "Around forms, cycles and motives", September 2014  
*Tel Aviv, Israel*, AMS meeting speaker, June 2014  
*Lausanne, EPFL*, Algebraic Geometry seminar, April 2014  
*Jussieu, Paris*, seminar "Autour des cycles algébriques", April 2014  
*Université d'Artois, Lens*, March 2014  
*Université de Rennes 1*, Algebraic Geometry seminar, February 2014  
*Göttingen University*, postdoc seminar, November 2013  
*Lyon*, seminar "Arithmétique", October 2013  
*Moscow*, conference "Global Fields", September 2013  
*Oberwolfach*, workshop "Algebraic  $K$ -theory and Motivic Cohomology", June 2013  
*Fields Institute, Toronto*, "Spring school and workshop on Torsors, Motives and Cohomological Invariants", May 2013  
*Université Paris 7*, seminar "Autour des cycles algébriques", April 2013  
*IHP, Paris*, seminar "Variétés rationnelles", April 2013  
*Universität Zürich*, Algebraic Geometry seminar, April 2013  
*Mainz University*, "SFB seminar", January 2013  
*Lausanne*, Number Theory seminar, December 2012  
*Grenoble*, "Points entiers, points rationnels", October 2012  
*Strasbourg*, Algebraic Geometry seminar, September 2012  
*University of Heidelberg*, seminar "Algebra und Zahlentheorie", June 2012  
*IMJ, Paris*, Number Theory seminar, May 2012  
*Université Versailles*, seminar "Algèbre et Géométrie", March 2012  
*Universität Zürich*, Symposium, February 2012  
*Université Rennes 1*, Algebraic Geometry seminar, February 2012  
*Université Bordeaux 1*, Number Theory seminar, February 2012  
*Institut Fourier, Grenoble*, Number Theory seminar, February 2012  
*IRMA Strasbourg*, Freiburg-Nancy-Strasbourg joint seminar in Algebraic and Complex Geometry, January 2012  
*Tokyo, Graduate School of Mathematics, University of Tokyo*, International Workshop on motives, December 2011  
*London, Imperial College*, Number Theory seminar, November 2011  
*Besançon, Université de Franche-Comté*, Algebra and Number Theory seminar, October 2011  
*Besançon, Université de Franche-Comté*, seminar "doctorant", October 2011  
*CIRM Luminy*, workshop "Géométrie arithmétique et motivique", September 2011  
*ENS Paris*, seminar "Variétés rationnelles", title: "Invariants birationnels dans la suite spectrale de Bloch-Ogus", June 2011  
*Tübingen*, seminar "Algebraische Geometrie", May 2011  
*Atlanta, Georgia, USA*, conference "Ramification in Algebra and Geometry", May 2011  
*IRMA Strasbourg*, "Géométrie algébrique et arithmétique : nouvelles tendances", March 2011  
*Université Lille 1*, seminar "Théorie de Galois et méthodes explicites", November 2010  
*Université Paris 6*, seminar "doctorant", April 2010  
*Université Lille 1*, seminar "Arithmétique", March 2010

*ETH Zürich*, seminar “Arithmetic and Geometry”, September 2009  
*ENS Paris*, seminar “Variétés rationnelles”, title : “ $R$ -équivalence sur les intersections complètes”,  
September 2009

## LECTURE SERIES, SEMINARS AND CONFERENCES ORGANIZED

1. AIM workshop *Rationality problems in Algebraic Geometry*, (July 2019, with A. Perry and S. Schreieder).
2. Lecture series, *Problems in rationality*, Moscow, HSE, (June 2018).
3. Lecture series, *Rationality problems*, Besançon, École jeunes chercheurs en théorie des nombres (June 2018).
4. Reading group *Anabelian geometry*, Courant Institute (January 2018 to March 2018, with A. Cadoret).
5. *Conference on Algebraic Geometry and Number Theory*, Florence (December 2017, with O. Wittenberg).
6. *Conference on Birational Geometry*, Simons Foundation, New York (August 2017, with I. Cheltsov and Y. Tschinkel).
7. Algebraic Geometry Seminar, Courant Institute (from September 2017).
8. Thematic program *Advances in Birational Geometry*, ESI, Vienna, (April-May 2017, with F. Bogomolov, J.-L. Colliot-Thélène. L. Katzarkov, A. Kuznetsov, Y. Tschinkel).
9. Lecture series, *Irrationality problems*, ESI, Vienna (April 2017).
10. Lecture series *Stable rationality*, GAGC, Luminy (January 2017).
11. Conference *Arithmetic Algebraic Geometry*, Courant Institute NYU, (August 2016, with Y. Tschinkel and D. Zakharov)
12. Lecture series *Stable rationality questions*, Liverpool (June 2015)
13. Lecture series *Diagonal Arithmetics*, IMPA, Rio de Janeiro (May 2015)
14. Seminar *Algebraic cycles*, Jussieu and Paris 7, (from September 2013, with B. Kahn and B. Klingler)
15. Conference *Global fields*, Moscow, (September 2013, with M. Hindry, Ph. Lebacque, M. A. Tsfasman, A. Zykin)
16. Students seminar *Quadratic forms*, Zürich University (February-March 2013)
17. Working group  *$p$ -adic deformations of algebraic cycle classes, after S. Bloch, H. Esnault et M. Kerz*, École Polytechnique, (2012, with A. Cadoret)
18. Working group *Rational connectedness, log pairs and stacks*, IRMA, Strasbourg University (2012-2013, with C. Gasbarri and G. Pacienza)
19. Seminar *Arithmetic geometry*, Strasbourg (2012-2013, with Ch. Huyghe)
20. Lecture series *Algebraic and geometric aspects of rationality and unirationality questions*, Yaroslavl summer school (July 2012)
21. Lecture series *Moduli spaces of rational curves and  $R$ -equivalence*, Grenoble summer school “Aspects arithmétiques des courbes rationnelles” (June 2010)
22. Working group *Zero-cycles on algebraic varieties over  $p$ -adic fields, after Saito and Sato*, École Normale Supérieure, (Paris 2010, with F. Charles and O. Wittenberg)
23. Undergraduate thesis adviser, École Normale Supérieure 2010, title: “Théorème de Roth”
24. Mathematics for non-specialists, École Normale Supérieure, Paris (2008-2010)

**TEACHING**

Courant Institute, 2015-present  
École Polytechnique, Paris, 2013-2017.

**LANGUAGES**

English (fluent), French(fluent), Russian/Belarusian (native speaker)