

Alexey ZYKIN

Professor at the University of French Polynesia

PERSONAL DETAILS

DATE AND PLACE OF BIRTH: 13.06.1984, Moscow, Russia
NATIONALITY: Russian
MARITAL STATUS: Single

ADDRESSES

ADDRESS IN POLYNESIA: University of French Polynesia
BP 6570, 98702 FAA'A Tahiti, French Polynesia
ADDRESS IN RUSSIA: Independent University of Moscow
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LANGUAGES

RUSSIAN: Mother tongue
ENGLISH: Fluent
FRENCH: Fluent

RESEARCH INTERESTS

- Zeta-functions and L -functions (modularity, special values, behaviour in families, Brauer–Siegel type results, distribution of zeroes).
- Algebraic geometry over finite fields (points on curves and varieties over finite fields, zeta-functions).
- Families of fields and varieties, asymptotic theory (infinite number fields and function fields, limit zeta-functions).
- Abelian varieties and Elliptic Curves (jacobians among abelian varieties, families of abelian varieties over global fields).
- Applications of number theory and algebraic geometry to information theory (cryptography, error-correcting codes, sphere packings).

PUBLICATIONS

Publications in peer-reviewed journals:

- *On logarithmic derivatives of zeta functions in families of global fields* (with P. Lebacque), International Journal of Number Theory, Vol. **7** (2011), Num. 8, 2139–2156.
- *Asymptotic methods in number theory and algebraic geometry* (with P. Lebacque), Publications Mathématiques de Besançon, 2011, 47–73.
- *Asymptotic properties of Dedekind zeta functions in families of number fields*, Journal de Théorie des Nombres de Bordeaux, **22** (2010), Num. 3, 689–696.

- *Jacobians among abelian threefolds: a formula of Klein and a question of Serre* (with G. Lachaud and C. Ritzenthaler), *Math. Res. Lett.* **17** (2010), no. 2, 323–333.
- *Asymptotic properties of Dedekind zeta functions in families of number fields*, *Russian Mathematical Surveys*, Vol. **64** (2010), Num. 6, 1145–1148.
- *On the Brauer–Siegel theorem for families of elliptic surfaces over finite fields*, *Mathematical Notes*, Vol. **86** (2009), Num. 1, 140–142.
- *Brauer–Siegel and Tsfasman–Vladut theorems for almost normal extensions of global fields*, *Moscow Mathematical Journal*, Vol. **5** (2005), Num. 4, 961–968.

Editorial work:

- *Proceedings of the international conference “Arithmetic, Geometry, Cryptography and Coding Theory”* (co-editor with Yves Aubry and Christophe Ritzenthaler), *Contemporary Mathematics series*, Vol. **574** (2012), 183 pp.

Articles in peer-reviewed proceeding of international conferences:

- *Uniform distribution of zeroes of L-functions of modular forms*, proceedings of the Conference AGCT 14 (2013), *Contemp. Math. series*, **637** (2015).
- *On the generalizations of the Brauer–Siegel theorem*, proceedings of the Conference AGCT 11 (2007), *Contemp. Math. series*, **487** (2009), 195–206.

Preprints submitted for publication:

- *On the number of rational points of jacobians over finite fields* (with P. Lebacque).
- *Asymptotic properties of zeta functions over finite fields.*

PRIZES AND AWARDS

- 2012, 2013: *Simons–IUM Fellowship.*
 2011–2013: *Pierre Deligne – “Dynasty” Foundation Fellowship.*
 2011: *Moscow Mathematical Society Prize* for young mathematicians.
 2006–2009: *Grant of the French Government* for a joint French—Russian Ph.D. program.
 2004–2005: *Petrovsky Fellowship.*

ACADEMIC EMPLOYMENT

- SINCE 11.2013: *Full professor* at the [University of French Polynesia](#).
 SINCE 03.2013: *Lecturer* at the [Independent University of Moscow](#) (IUM).
 SINCE 01.2011: *Researcher* at [Poncelet French–Russian Laboratory](#) (UMI 2615).
 SINCE 02.2010: *Researcher* at the [Institute for Information Transmission Problems of the Russian Academy of Sciences](#).
 09.2009–11.2013: *Associate Professor* at the [Mathematical Department](#) of the National Research University Higher School of Economics (HSE).
 02.2012–09.2013: *Head* of the [Laboratory of Algebraic Geometry and its applications of HSE](#).
 02.2011–01.2012: *Researcher* at the [Laboratory of Algebraic Geometry and its applications of HSE](#).

EDUCATION

- 2006 — 2009: *Ph. D.* at the [Institut de Mathématiques de Luminy, Université de la Méditerranée](#). The Ph. D. thesis “PROPRIÉTÉS ASYMPTOTIQUES DES CORPS GLOBAUX” under supervision of Sergey Vladuts and Michael Tsfasman was defended on the 4th of June 2009 in Marseille.
Jury: Michel Balazard, Marc Hindry (referee), Gilles Lachaud (president), Emmanuel Royer, René Schoof (referee), Michael Tsfasman (advisor), Sergey Vladuts (advisor).
- 2005 — 2010: *Ph. D.* at the [Mathematical Institute of the Russian Academy of Sciences](#) and at the [Independent University of Moscow](#).
The thesis “ASYMPTOTIC PROPERTIES OF GLOBAL FIELDS” under supervision of Michael Tsfasman and Armen Sergeev was defended on the 14th of October 2010 in Moscow.
- 2001 — 2006: *Specialist degree in Mathematics* (Master’s of Sciences equivalent), [Faculty of Mechanics and Mathematics](#) of Moscow State University.
Mention très honorable.
- 2000 — 2005: *Specialist degree in Mathematics* (Master’s of Sciences equivalent), [Independent University of Moscow](#).
- 1998 — 2001: [Moscow Mathematical Highschool Number 57](#), silver medal.

SELECTED CONFERENCE TALKS

- 06.2014: “Algebraic Geometry and Number Theory”, Moscow, Russia.
Talk: *On asymptotic properties of varieties over global fields.*
- 05.2013: “Arithmetic days-2”, Saint Petersburg, Russia.
Talk: *Asymptotic properties of global fields and varieties over them.*
- 06.2011: “Arithmetic days in Moscow”, Moscow, Russia.
Talk: *Asymptotic properties of zeta functions.*
- 06.2010: Colloque des Jeunes Chercheurs en Théorie des Nombres, Strasbourg, France.
Talk: *Jacobiennes parmi les variétés abéliennes de dimension 3.*
- 12.2009: “Théorie des Nombres et Applications”, Marseille, France.
Talk: *Asymptotic properties of zeta functions.*
- 07.2009: “Journées Arithmétiques”, Saint-Etienne, France.
Talk: *On the Euler–Kronecker constant and limit zeta functions.*
- 03.2009: “Arithmetic, Geometry, Cryptography, and Coding Theory”, Marseille, France.
Talk: *On the asymptotic properties of zeroes of L-functions.*
- 12.2008: “Zeta Functions-2”, Moscow, Russia.
Talk: *On the Euler–Kronecker constant and limit zeta functions.*
- 11.2007: “Arithmetic, Geometry, Cryptography, and Coding Theory”, Marseille, France.
Talk: *On the Brauer–Siegel Theorem for Varieties over Global Fields.*
- 07.2007: “Global Fields”, Moscow, Russia.
Talk: *Asymptotic problems in the theory of global fields.*
- 09.2006: “Zeta Functions”, Moscow, Russia.
Talk: *The generalized Brauer–Siegel theorem.*
- 09.2005: “Arithmetic, Geometry, and Coding Theory”, Marseille, France.
Talk: *The generalized Brauer–Siegel theorem.*

SELECTED SEMINAR TALKS

- 06.2012: Number Theory Seminar, Institut Fourier, Grenoble, France.
Talk: *Propriétés asymptotiques des fonctions zêta.*
- 11.2011: Seminar of the Laboratory of Algebraic Geometry and its Applications, Moscow, Russia.
Talk: *Jacobians and abelian varieties over non algebraically closed fields.*
- 02.2011: Seminar of Moscow Mathematical Society, Moscow, Russia.
Talk: *Asymptotic problems in number theory and limit zeta-functions.*
- 01.2010: Seminar of the Institute for Information Transmission Problems, Moscow, Russia.
Talk: *Asymptotic properties of global fields.*
- 05.2009: Algebraic Geometry Seminar, Mathematical Institute of the Russian Academy of Sciences, Moscow, Russia.
Talk: *Jacobians and abelian threefolds.*
- 12.2008: Number Theory Seminar, Institut Fourier, Grenoble, France.
Talk: *Jacobiennes parmi les variétés abéliennes de dimension 3.*
- 11.2008: Number Theory Seminar, Hebrew University of Jerusalem, Israel.
Talk: *On the generalized Brauer–Siegel theorem and limit zeta functions.*
- 11.2007: Number Theory Seminar, Institut de Mathématiques de Luminy, Marseille, France.
Talk: *Sur le théorème de Brauer–Siegel pour des variétés sur des corps globaux.*
- 10.2007: Number Theory Seminar, Institut Fourier, Grenoble, France.
Talk: *Problèmes asymptotiques en théorie des corps globaux.*

RESEARCH VISITS

- 06.2013: *Invited Professor* at the Institut de Mathématiques de Toulouse, invited by Marc Perret.
- 12.2012: Max Planck Institute, Bonn, Germany, invited by Vasilij Golyshev.
- 07.2011: National Center for Theoretic Sciences, Taiwan, invited by Winnie Lie.
- 03.2011: Institut de Mathématiques de Luminy, Marseille, France, invited by Christophe Ritzenthaler.
- 06.2010: Département de mathématiques de Besançon, France, invited by Christian Maire.
- 03.2009: Mathematical Laboratory of Blaise Pascal University, Clermont-Ferrand, France, invited by Emmanuel Royer.
- 11.2008: Bar-Ilan University, Israel, invited by Boris Kunyavskii.
- 01.2005: Exchange “École Normale Supérieure de Paris” — “Independent University of Moscow”, Paris, France.

ORGANIZED CONFERENCES

- 12.2014: “Zeta-functions 5”, Independent University of Moscow, coorganiser with Daniel Fiorilli, Philippe Lebacque, and Michael Tsfasman.
- 06.2014: “Algebraic Geometry and Number Theory” (conference on the occasion of M.A. Tsfasman’s and S.G. Vladuts’s 60th birthdays), Independent University of Moscow, coorganiser with Marc Hindry, Yulij Ilyashenko, Philippe Lebacque, and Sergey Rybakov.
- 09.2013: “Global Fields 3”, Independent University of Moscow, coorganiser with Marc Hindry, Philippe Lebacque, Alena Pirutka, and Michael Tsfasman.
- 05.2013: “Diophantine geometry”, Independent University of Moscow, coorganizer with Marc Hindry, Philippe Lebacque, and Michael Tsfasman.
- 05.2013: “Arithmetic days 2”, Saint-Petersburg State University, coorganizer with Ivan Fesenko, Sergey Vostokov, and Igor Zhukov.
- 11.2012: “Zeta Functions 4”, Independent University of Moscow, coorganizer with Marc Hindry, Philippe Lebacque, and Michael Tsfasman.
- 04.2012: “Arithmetic days 1”, Independent University of Moscow, coorganizer with Ivan Fesenko and Igor Zhukov.
- 10.2011: “Global Fields 2”, Independent University of Moscow, coorganizer with Michael Tsfasman and Philippe Lebacque.
- 03.2011: “Arithmetic, Geometry, Cryptography, and Coding Theory”, CIRM, Marseille, coorganizer with Yves Aubry and Christophe Ritzenthaler.
- 06.2010: “Zeta Functions 3”, Independent University of Moscow, coorganizer with Michael Tsfasman and Michel Balazard.
- 07.2007: “Global Fields 1”, Independent University of Moscow, coorganizer with Michael Tsfasman.

ORGANIZED SUMMER SCHOOLS

- 07.2014: Summer School “[Algebra and Geometry 4](#)”, Yaroslavl, Russia, principal organizer; coorganizers: Fedor Bogomolov, Alexander Kuznetsov, Alexander Tikhomirov, Misha Verbitskiy.
The courses were given by Semyon Alesker, Alexander Beilinson, Sergei Ivanov, Roman Karasev, Alexander Razborov, Alexei Skorobogatov, Misha Verbitskiy, Vladimir Voevodsky. There were more than 70 participants, for the most part graduate students, Ph. D. students, and young researchers.
- 07.2013: Summer School “[Algebra and Geometry 3](#)”, Yaroslavl, Russia, principal organizer; coorganizers: Fedor Bogomolov, Alexander Tikhomirov, and Misha Verbitskiy.
The courses were given by Marc Hindry, David Kazhdan, Dmitry Leites, Andrey Okunkov, Valentin Ovsienko, Yuri Tschinkel, Misha Verbitskiy, Anton Zorich. There were more than 70 participants, for the most part graduate students, Ph. D. students, and young researchers.
- 07.2012: Summer School “[Algebra and Geometry 2](#)”, Yaroslavl, Russia, principal organizer; coorganizers: Fedor Bogomolov, Alexander Tikhomirov, and Sergey Tikhomirov.
The courses were given by Jean-Louis Colliot-Thélène, Valery Gritsenko, Alexander Kirillov, Alexander Merkurjev, Viacheslav Nikulin, Alexei Pantchichkine, Alena Pirutka, Vsevolod Schevchishin. There were more than 70 participants, for the most part graduate degree students, Ph. D. students, and young researchers.
- 08.2011: Summer School “[Algebra and Geometry](#)”, Yaroslavl, Russia, principal organizer; coorganizers: Alexander Tikhomirov, Sergey Tikhomirov, and Misha Verbitskiy.
The courses were given by Yuri Bilu, Fedor Bogomolov, Keith Conrad, Ivan Fesenko, Sergey Gorchinskiy, Boris Kunyavskii, Dmitriy Panov, Misha Verbitskiy. There were more than 65 participants, for the most part graduate degree students, Ph. D. students, and young researchers.

ORGANIZED SEMINARS

Being organizer of the following seminars I assured their proper functioning along with giving numerous talks myself.

- 2009–2013: “*Arithmetic, Geometry, and Coding Theory*”, coorganizer with Michael Tsfasman, Independent University of Moscow, Poncelet French–Russian Laboratory, Institute for Information Transmission Problems of the Russian Academy of Sciences.
- 2009–2010: “*Monstrous Moonshine*”, coorganizer with Boris Feigin and Evgeniy Smirnov, Mathematical Department of HSE, Moscow, Russia.
- 2008–2009: “*Variétés abéliennes*”, coorganizer with Christophe Ritzenthaler, Institut de Mathématiques de Luminy, Marseille, France.
- 2007–2008: “*Multiplication complexe*”, coorganizer with Christophe Ritzenthaler and David Kohel, Institut de Mathématiques de Luminy, Marseille, France.
- 2006–2007: “*Surfaces algébriques*”, coorganizer with Frédéric Edoukou, Institut de Mathématiques de Luminy, Marseille, France.
- 2005–2006: “*Automorphic Forms*”, coorganizer with Wadim Zudilin, Moscow State University, Russia.

TEACHING EXPERIENCE

- AUTUMN 2014: Lectures and exercise sessions in *General Mathematics* for undergraduate students, lectures and exercise sessions in *Calculus, Algebra, and Arithmetic* for graduate students of the University of French Polynesia (UPF).
- SPRING 2014: Lectures and exercise sessions in *Algebra* and *Calculus* for undergraduate students of UPF.
- SPRING 2012, 2013: Lectures and exercise sessions in *Discrete Mathematics* for undergraduate students of the Mathematical Department of the National Research University Higher School of Economics (HSE).
- 2010–2011, 2012–2013: Lecture course “*Number Theory*” for undergraduate and graduate students of the HSE and of the Independent University of Moscow (IUM).
- 2012–2013: Lecture course “*Modular Forms*” for the HSE undergraduate and graduate students.
- 2011–2012: Lecture course “*Elliptic Curves*” for the HSE and IUM graduate students.
- 2011–2012: Lecture course “*Modular Forms, Elliptic Curves and Galois Representations*” for the HSE graduate students.
- 2010–2011: Lecture course “*Arithmetic and Applications*” for the HSE undergraduate and graduate students.
- AUTUMN 2010: Exercise sessions in *Algebraic Geometry* and *Commutative Algebra* for the students of the “Math in Moscow” program at the IUM.
- 2009–2010: Exercise sessions in *Algebra, Calculus, Topology, and Discrete Mathematics* for the HSE undergraduate students.

INVITED LECTURES

- 01.2013: Conference and Winter School “Problems in Modern Mathematics”, Yekaterinburg, Russia.
A series of 4 lectures entitled “*Elliptic curves and cryptography*”.
- 07.2012: Summer School “Modern Mathematics”, Dubna, Russia.
A series of 3 lectures entitled “*Elliptic curves and congruent numbers*”.
- 11.2011: Federal Baltic University, Kaliningrad, Russia, invited by Alexey Zaytsev.
A series of 8 lectures entitled “*Modular curves and modular forms*”.

SCIENTIFIC SUPERVISION

- 2014-2017: Supervision of a PhD student at the University of French Polynesia and at the Mathematical Department of HSE.
- 2013-2014: Supervision of one Bachelor’s and one Master’s theses at the Mathematical Department of HSE.
- 2012-2013: Supervision of 7 Bachelor’s and 1 Master’s theses at the Mathematical Department of HSE.
- 2011-2012: Supervision of 8 Bachelor’s theses at the Mathematical Department of HSE.
One of these Bachelor’s theses was published in the “Mathematical Education” journal. Another one by Dmitry Kubrak resulted in a research article “Brauer–Siegel theorem for algebraic tori” for which he was awarded the *Moebius Prize* and the first prize of the undergraduate thesis competition for HSE students.
- 2010-2011: Supervision of 7 Bachelor’s theses at the Mathematical Department of HSE. Supervision of Master’s thesis of a student of Ecole Polytechnique (Paris).
- 2009-2010: Supervision of 7 Bachelor’s theses at the Mathematical Department of HSE.

OTHER ADMINISTRATIVE FUNCTIONS

- SPRING 2015: *Class adviser* for the first year undergraduate students of the “Mathematics—Informatics” program of the UPF.
- SINCE 01.2014: *Head* of the laboratory “[Algebraic Geometry and Applications to Information Theory](#)” (GAATI) of the University of French Polynesia.
- SINCE 01.2014: *Member* of the advisory board of the Graduate School of the UPF.
- SINCE 09.2011: *Coordinator of Moscow branch* of the Number Theory CNRS GDR STN network.
- SINCE 04.2011: *Elected member of the board of administration* of the Independent University of Moscow.
Main responsibilities: elaboration of teaching program, decisions on administrative and financial matters.
- 2013: Co-organizer with Marc Hindry, Philippe Lebacque, and Michael Tsfasman of the [Arithmetic Geometry Year](#) of Poncelet French–Russian Laboratory in Moscow.
The activities included four international conferences (“Zeta Functions 4”, “Diophantine Geometry”, “Arithmetic Days-2”, “Global Fields-3”), one weekly seminar and a number of mini-courses (Yuri Bilu, Florian Breuer, Adrien Deloro, Antoine Ducros, Arnaud Durand, Aurélien Galateau, Valery Gritsenko, Marc Hindry, Philippe Lebacque, Francesco Lemma, Jérôme Poineau, Alexander Schmidt, Gabor Wiese were among the lecturers).
- 2011-2012: *Class adviser* for the second year undergraduate students of the Mathematical Department of HSE.
- 2010-2011: *Class adviser* for the first year undergraduate students of the Mathematical Department of HSE.

RESEARCH GRANTS

- Member of the ANR Globes project “*Espaces de Berkovich globaux*” (2013-2017).
- Coordinator of the RFBR 12-01-31280 mol-a project “*Arithmetic of abelian varieties over finite fields and function fields*” financed by the Russian Foundation for Basic Research (2012-2013).
- Member of the research projects financed by the Russian Foundation for Basic Research RFBR 07-01-00051A (2007-2009), RFBR 07-01-92211-CNRS (2007-2009), RFBR 08-07-92495-CNRS (2008-2010), RFBR 09-01-12170-OFI-M (2009-2010), RFBR 10-01-93110-CNRS (2010-2012), 11-01-12072-OFI-M-2011 (2011-2012), RFBR 11-01-00393-A (2011-2013), RFBR 12-01-92697-IND-A (2012-2013), and of the project 2010-1.3.1-111-017-029 (2010-2011) financed by the Ministry of Education and Science of the Russian Federation.

REVIEWING

- I am a referee for the following journals: FINITE FIELDS AND APPLICATIONS, MOSCOW MATHEMATICAL JOURNAL, BULLETIN OF THE AUSTRALIAN MATHEMATICAL SOCIETY (at least one article for each journal).
- I am a reviewer for ZENTRALBLATT MATH and for MATHEMATICAL REVIEWS.

COMPUTER SKILLS

L^AT_EX, C, Pascal, PARI/GP, Sage