

## GRITSENKO Valery

31.03.1955, was born in Riga (Latvia), male

**Address:** U.M.R. 8524, Laboratoire Paul Painlevé  
Université des Sciences et Technologies de Lille (USTL)  
59655 Villeneuve d'Ascq Cedex, France

**Tel./Fax/Mob.:** +33(0)320434221, +33(0)320434302, +33(0)688951805

**E-mail:** Valery.Gritsenko@math.univ-lille1.fr

**Position:** Full Professor since 01.09.1998

Senior member of Institut Universitaire de France since 2013 (see below)

The full professor position has three levels in France: the second, first and exceptional class with promotion between them. Now I am professor of the highest level “professeur de classe exceptionnelle”.

**Degrees:** French professor qualification (1998) which is equivalent to HDR (“Habilitation à diriger des recherches”), the highest academic qualification in Europe.

Diploma of Associate Professor of the Committee of Higher Education of the USSR 1989

Ph.D. in Leningrad Department of Steklov Mathematical Institute 1980

Diploma in Mathematics (classed as excellent) at Leningrad State University 1977

### **Committees and Membership of Editorial Board:**

Since 2012, I am a member of the executive committee of the **Laboratoire d'Excellence CEMPI** (“*Centre Européen pour les Mathématiques, la Physique et leurs Interactions*”) in Lille and the coordinator of the research theme “*Algebraic geometry, modular forms, with applications to physics*” of this new research center.

President of the selection committees for new open positions of the Mathematical Department of University Lille I (2011–2015).

In 2003, I initiated the **French–German automorphic seminar Lille–Aachen–Köln–Siegen** (see page 3). Since 2003, I am one of its research supervisors.

In 2008–2014, I was a member of the Editorial Board of the *Central European Journal of Mathematics*. Since 2014, I am a member of the Editorial Advisory Board of *European Journal of Mathematics*.

**Honours:** Senior member of **Institut Universitaire de France** since 2013.

The Institut Universitaire de France (IUF) is a French service of the Ministry of Higher Education that distinguishes each year a small number of university professors for their research excellence, as evidenced by their international recognition. A member benefits from a reduction of 2/3 of this statutory education service and has a big research grant.

**My career before 1998.** From September 1972 to August 1977 I studied at Leningrad State University where I obtained a Master degree in Mathematics (classed as excellent). From November 1977, I did my PhD study at **PDMI** (Steklov Mathematical Institute of the Russian Academy of Science in St.Petersburg). I defended my PhD on March 10, 1980.

After that I held three different research positions at POMI: Research Assistant (12.1979–06.1986), Researcher (07.1986–12.1987), Head Researcher (12.1987–08.1998). The Steklov Mathematical Institute is a research institute of the Russian Academy of Science. It was possible to have a second complementary permanent half-time position for teaching. I had one at the Department of Pure Mathematics of St.Petersburg Electrotechnical University: Assistant Professor 1982–1986 and Associate Professor 1986–1996. After 1990 when one could work abroad from USSR and before 1998, I worked as invited professor (or researcher) in Germany (MPIM in Bonn, Universities of Göttingen, Heidelberg, Hannover, Bielefeld, Aachen, Hamburg), in Japan (RIMS, Kyoto), in England (Cambridge), in France (Grenoble and Lille), in Italy (Rome I) and in Switzerland (ETH, Zurich). The most important position was: Full International Professor at Research Institute of Mathematical Science (RIMS) of Kyoto University (12 months in 1998).

**The best mathematical results.** I research in **three different areas:** (1) *the theory of automorphic forms*, (2) *algebraic geometry* and (3) *the theory of hyperbolic Kac–Moody Lie algebras (Borcherds algebras)*. I have more than 70 publications. My strongest result in algebraic geometry is a solution (together with K. Hulek and G. Sankaran) of **the last open problem from A. Weil’s program** (1957) on  $K3$  surfaces about the moduli spaces of polarised  $K3$  surfaces. Our paper was published in *Inventiones Mathem.* in 2007. This result was presented by C. Voisin at the **Bourbaki seminar** ( $n^{\circ}$  981, 2007).

The series of papers (together with V. Nikulin) on Lorentzian Kac–Moody algebras was presented by Steklov Mathematics Institute of the Russian Academy of Science for the **State Prize** (the highest scientific prize in Russia) in 2000.

My research results were selected **three times** for presentation at **Arbeitstagung** of the Max Planck Institute for Mathematics in Bonn: 1997 (Classification of Lorentzian Kac–Moody algebras), 1999 (Generalized Witten genera), 2005 (Moduli spaces of polarized  $K3$  surfaces). My results have connections with string theory. There are more than 150 references on my mathematical papers in string literature.

**Beneficiary of the research grants** (since 1999): IUF (2013–2018);

ANR research program (2009–2012) “*Holomorphically symplectic manifolds, their moduli spaces and automorphic forms*” (ANR-09-BLAN-0104-01) between the universities of Paris, Lille, Grenoble and Rennes (I was research coordinator of two projects of this program);

PEDR (1999–2011), PES (2011–2018) (these are two principal grants of the Ministry of Higher Education of France); BQR (2011); Procopé Lille-Siegen (2008–09);

Research stipendium of the Max-Planck-Institut für Mathematik in Bonn for one semester in 1999, 2002, 2005, 2008, 2010, 2012.

**Activities for the mathematical community.** I was responsible for the scientific programs of **two research semesters** at the Max-Planck-Institut für Mathematik in Bonn: “*Explicit constructions in the theory of automorphic forms*” (6 months in 2010) and “*Automorphic products*” (together with R. Borcherds and D. Zagier, in 1999).

Since 1999, I was the scientific organiser (an initiator and a responsible for the scientific program) of **eighteen international conferences:** four in Luminy (France) (2001, 2007, two in 2011), two in Bonn (1999, 2010), four in St. Petersburg (two in 2007, 2008, 2013),

seven in Lille (2001, 2003, 2007, 2009, 2012 and two in 2014) and one in Edinburgh (2012). Four of them were on subjects common to mathematics and physics: *Automorphic forms, Lie algebras and String theory* (with P. Vanhove) in Lille (2014), *Algebraic geometry, modular forms and applications to physics* at ICMS (International Center for Mathematical Sciences) in Edinburgh in 2012 (51 participants), *Automorphic forms, Kac–Moody algebras and Strings*(with Dabholkar and Pioline) in Bonn (2010), *Automorphic forms: Physics and Mathematics* (with Pioline) in Lille (2007).

In 2007, I was a member of the program committee of the Symposium on the occasion of the 300th anniversary of the birth of Leonhard Euler in St. Petersburg (more than 300 participants).

**Planned conferences:** Workshop *Automorphic L-functions* (with Dimitrov) in 2014.

*Moduli spaces and Modular forms* (together with J. Bruinier and G. van der Geer), Mathematisches Forschungsinstitut Oberwolfach, Germany, 2016.

**French–German automorphic seminar Lille–Aachen–Köln–Siegen.** In November 2003, I organised this seminar together with my colleagues J. Bruinier (Köln), A. Krieg (Aachen) and N.-P. Skoruppa (Siegen). Now this is the largest seminar in Europe on classical modular forms: there are more than 30 permanent members. The seminar is a base for joint research and for PhD programs. I organised two such programs on “*Weil representations and automorphic forms on orthogonal groups*” in Lille and Siegen in 2008. The last 44-th session of the seminar was organised in Aachen in June 2014.

**PhD students.** In Lille I have had four PhD students:

Fabien Cléry, *Relèvements arithmétique et multiplicatif de formes de Jacobi*;

Benoit Grandpierre, *Produits automorphes, classification des réseaux et théorie du codage*;

Patrick Lemaire, *Formes quasi-modulaires et développement de Taylor de formes modulaires de Siegel*;

Caroline Desreumaux, *Formes de Jacobi relatives au réseau de racines  $A_2$* .

For all these PhDs I was the only director. At the moment I have one PhD student of the second year, Martin Woitalla, in RWTH, Aachen (Germany).

**Invited researcher** (since 1999):

State University Higher School of Economics, Moscow (two months in 2013)

Max Planck Institute for Mathematics in Bonn (2012, 2010, 2008, 2005, 2002, 1999)

KIAS (Korea Institute for Advanced Study) Seoul (08.2011)

Leibniz University of Hannover, Germany (2013, 2011, 2009, 2007, 2006 et 2003)

University of Nagoya, Japan (a month in 2010)

Newton Institute, Cambridge (a month in 2000)

RIMS (Research Institute of Mathematical Science), University of Kyoto (1998)

**Invited talks at international conferences (55 talks since 1999):**

2014  $K3$ , Enriques Surfaces and Related Topics, Nagoya

2014 Motivic structures on quantum cohomology and pencils of Calabi-Yau motives, Bonn

2014 Modular Forms, Oberwolfach, Germany

- 2014  $K3$  surfaces and their moduli, Schiermonnikoog, Netherlands
- 2014 Automorphic forms, Lie algebras and String theory, Lille
- 2014 Journées de Géométrie Algébrique et Equations aux Dérivées Partielles, Lens
- 2013 Frontiers and New Perspectives in Geometry and Physics, Euler International Mathematical Institute, St. Petersburg
- 2013 Global Fields, Laboratoire Poncelet and State University Higher School of Economics, Moscow
- 2013 Modern problems and perspectives of science and education: Mathematics, St. Petersburg Department of Steklov Mathematical Institute
- 2013 Diophantine Geometry, Laboratoire Poncelet and State University Higher School of Economics, Moscow
- 2013 Automorphic Forms and  $L$ -Functions, University of Darmstadt
- 2013 The Langlands Program and Adelic Theory, Euler International Mathematical Institute, St. Petersburg
- 2012 Galois representations and pencils of Calabi-Yau motives, MPIM, Bonn
- 2012 CEMPI Inaugural Conference, University of Lille
- 2012 Algebraic and Complex Geometry, Leibniz University of Hannover
- 2012 Holomorphic symplectic manifolds and moduli spaces, University of Grenoble
- 2012 Motive structure on quantum cohomology, MPIM, Bonn
- 2012 Modular forms, Mock Theta Functions, and Applications, University of Köln
- 2012 International Workshop on Number theory and Modular forms, GUTech, Muscat, Oman
- 2011 Modular forms and their geometric applications, in KIAS (Korea Institute for Advanced Study), Seoul
- 2011 Algebro-geometric methods in Gauge Theory and General Relativity, Institute for Advanced Study in Physics ([www.h-w-k.de](http://www.h-w-k.de)) Delmenhorst (Bremen)
- 2011 Modular Forms and Mock Modular Forms and their Applications in Arithmetics, Geometry and Physics, SISSA, Trieste
- 2011 GDR Géométrie Algébrique et Géométrie Complexe, CIRM, Luminy
- 2011 Formes automorphes, valeurs spéciales de fonctions  $L$ , congruences et variétés de Shimura, Grenoble
- 2010 Lattices, Reflection Groups and Algebraic Geometry, Nagoya, Japan
- 2010 Mathematics-XXI century. PDMI 70th anniversary, St. Petersburg
- 2010 Automorphic forms, Kac–Moody algebras and Strings, MPIM, Bonn
- 2009 Moduli in Berlin
- 2009 Lie algebras, vertex algebras and automorphic forms, Edinburgh
- 2009 Moduli and Discrete Groups, RIMS, Kyoto
- 2009 Mock Theta-functions, MPIM, Bonn
- 2008 Automorphic Representations, Automorphic Forms,  $L$ -functions, and Related Topics, RIMS, Kyoto
- 2008 Complex Analysis, Oberwolfach
- 2008 Algebra and Algebraic Geometry MIAN–PDMI 2008, St. Petersburg
- 2007 Black Holes, Black Rings and Modular Forms, XXXVIIth Paris Summer Institute, ENS, Paris
- 2007 Formes de Jacobi et applications, CIRM, Luminy

- 2007 Groups and symmetries: from the Neolithic Scots to John McKay, CRM, Montréal
- 2007 Modular forms, Oberwolfach
- 2007 Formes Automorphes : Physique et Mathématiques, USTL, Lille
- 2006 Colloque “Modular forms” of Foundation Compositio Mathematica, Schiermonnikoog (Holland)
- 2006 Globale Methoden in der komplexen Geometrie, Bayreuth
- 2005 *Arbeitstagung* (the selected talk), Max-Planck-Institut für Mathematik, Bonn
- 2005 GAC-Géométrie Algébrique Complexe, Luminy
- 2005 Automorphic forms and Related Moduli Spaces, Rome
- 2005 Colloque “Journées de géométrie algébrique”, Lille
- 2003 Géométrie des espaces de modules, USTL, Lille
- 2002 Modular forms in many variables, Oberwolfach
- 2001 Formes de Jacobi et applications, CIRM, Luminy
- 2000 Singularity theory and Quantum physics, Cambridge
- 2000 Analyse Complexe, Oberwolfach
- 1999 Géométrie Algébrique Complexe, CIRM, Luminy
- 1999 Symposium international consacré à Rokhline, St. Petersburg (l’exposé plénier)
- 1999 *Arbeitstagung* (the selected talk), MPIM, Bonn
- 1999 Produits automorphes, MPIM, Bonn
- 1999 Modular forms and zeta-functions, International Symposium of Mathematical Society of Japan, Kyoto

**Expertise:** I prepare regularly reports of presented papers in the following mathematical journals: *Inventiones Mathem.*, *Duke Mathem. Journal*, *Proceeding of London Mathem. Society*, *Compositio Mathem.*, *Journal of Algebraic Geometry*, *Mathematische Annalen*, *Journal of Number Theory*, *Advance of Mathem.*, *Mathem. Z*, *Mathematische Nachrichten*, *Russian Mathem. Survey*, *Manuscripta Math.*, *Sigma*.

I prepared expert reports of research projects submitted in the European Research Agency (Bruxelles) and in the national research agencies of Germany, Holland, Canada, Chile.

### Organization of international meetings

I was the scientific organiser (and often the initiator) of eighteen international conferences. Three of them were on subjects common to mathematics and physics.

- 1) *Automorphic forms, Lie algebras and String theory* (together with P. Vanhove), Lille, 03–06.03.2014, see: <http://sites.google.com/site/vanhovepierre/>.
- 2) *Moduli spaces of irreducible symplectic varieties, cubics and Enriques surfaces*, (together with D. Markushevich and O. Serman) Lille, 24–28.03.2014, see <http://math.univ-lille1.fr/~serman/moduli2014.html>.
- 3) *The Langlands Program and Adelic Theory*, EIMI (Euler International Mathematical Institute, St. Petersburg, June 2013 (with S. Gorchinskiy, A. Parshin and A. Smirnov), see: <http://www.pdmi.ras.ru/EIMI/2013/Lpat/index.html>.
- 4) *Algebraic geometry, modular forms and applications to physics* in ICMS (International Center for Mathematical Sciences), Edinburgh, November 2012 (with T. Kondo, R. Salvati Manni, G. Sankaran and K. Wendland), 51 participants, see: <http://www.icms.org.uk/workshops/algebraic>.

- 5) CEMPI Inaugural Conference : *Géométrie algébrique, formes modulaires et applications à la physique* (with D. Markushevich) Lille, October 2012.
- 6) *Constructions explicites dans la théorie des formes automorphes* (with N.-P. Skoruppa and A. Krieg), CIRM, Luminy, May 2011.
- 7) *Espaces de modules et formes automorphes* (with D. Markushevich), CIRM, Luminy, October 2011.
- 8) *Automorphic forms, Kac–Moody algebras and Strings*, MPIM in Bonn, May 2010 (with A. Dabholkar and B. Pioline).
- 9) *Holomorphically symplectic varieties and moduli spaces*, Lille, June 2009 (with D. Markouchevich), see: <http://math.univ-lille1.fr/~markushe/MOD2009>.
- 10) *Algebra and Algebraic Geometry MIAN–PDMI 2008*, The Steklov Mathematical Institute, St. Petersburg, December 2008 (with A. Parshin).  
See: <http://www.pdmi.ras.ru/EIMI/2008/mp/progE.html>.
- 11) *Formes de Jacobi et applications*, CIRM, Luminy, May 2007 (with N.-P. Skoruppa).
- 12) International Mathematical Congress dedicated to the 300th Anniversary of Leonhard Euler’s Birth, St. Petersburg, June 2007 (a member of the organizing Committee).
- 13) *Modular Forms and Moduli spaces*, EIMI, St. Petersburg, 2007 (with D. Orlov and P. Zograf), see: <http://www.pdmi.ras.ru/EIMI/2007/mfms/prog.html>.
- 14) Workshop *Formes Automorphes : Physique et Mathématiques*, Lille, December 2007 (with B. Pioline).
- 15) *Géométrie des espaces de modules*, Lille, June 2003 (with D. Marushevich).
- 16) *Formes de Jacobi et applications*, CIRM, Luminy, 2001 (with N.-P. Skoruppa).
- 17) *Les Journées internationales des formes modulaires*, Lille, January, 2001.
- 18) *Kac–Moody algebras and automorphic products* (with R. Borcherds and D. Zagier) The Max Planck Institute for Mathematics in Bonn, June 1999.

**Advanced courses.** Besides the usual university courses I regularly read advanced research courses. During **the last six years** I gave the following courses.

- 2013 *Automorphic relations between Kac-Moody Lie algebras and quantum black holes.* Mini-course at DFG-Research Training Group “Analysis, Geometry and String Theory”, Leibniz University, Hannover.
- 2013 *Automorphic forms on the tube of future. Introduction to the theory of Borcherds.* A twelve hours course for students of the State University Higher School of Economics, Moscow.
- 2012 *Paramodular forms and L-functions,* Mini-course at the Max-Planck-Institut für Mathematik in Bonn.
- 2012 *Lattices of Niemeier and Leech.* Course at the summer school (12h) for Russian Master’s students organized by the Bogomolov laboratory in Yaroslavl (65 participants), Russia
- 2011 *Jacobi modular forms and automorphic Borcherds products,* Mini-course at the Korea Institute for Advance Study, Seoul.

- 2009 *The modular differential operators and a problem of K. Saito.*  
Six lectures at my research seminar in Lille.
- 2008 *Groupes finis, réseaux et théorie du codage.*  
A semester course for Master's students in Lille.
- 2008 *Introduction in automorphic forms on the orthogonal groups.*  
A course for Ph.D. students at the University of Siegen (Germany).

**Recent research results.** In 2010–2013, I found solutions of problems on Kac–Moody algebras, reflective modular forms and moduli spaces posed by well known mathematicians (Igor Frenkel, S. Kondo, K-I. Yoshikawa) and I answered a question posed by a group of string physicists (A. Dabholkar and others).

1. In my preprint [70] from 2012 (see the list of publications) I proposed 23 new constructions of the famous Borcherds modular forms  $\Phi_{12}$ . In particular, I gave an answer on **the old question of Igor Frenkel** (1983) about possible relations between affine and hyperbolic Kac–Moody algebras. My answer gives a new way to study the fake Monster Lie algebra as a module over 23 different affine Lie algebras.
2. The method of my preprint [70] will be used in order to construct new important classes of Lorentzian Kac–Moody (super) Lie algebras. See my future papers [P1] (The baby functions of the Borcherds form  $\Phi_{12}$ ), [P2] (The automorphic discriminants of the exceptional Arnold singularities) and [P8] (The 2-elementary class, the joint project with V. Nikulin).
3. The first geometric application of the method from [70] is the result on Kodaira dimension of the moduli space of Enriques surfaces with level 2 structure (**the problem of S. Kondo**). My solution ([P0], in preparation) opens a new research project about the moduli spaces of polarized Enriques surfaces (a joint project [P4] with K. Hulek).
4. Proposing a new construction of the Borcherds–Enriques modular form, I solved in 2010 (see [67]) **a problem of K.-Y. Yoshikawa** (2008) about Lorentzian Kac–Moody algebras defined by the Bershadsky–Cecotti–Ooguri–Vafa analytic torsion of special Calabi–Yau varieties. This problem is closely related to a question formulated by two physicists J. Harvey and G. Moore in 1998.
5. In the paper [65] (Proc. of London Math. Soc. 2011, with F. Cléry) we classified the simplest Siegel type analogues of the Dedekind eta-functions and we solved **a problem posed by Dabholkar, Govindarajan and Sen** during the Paris Summer Institute “Black Holes, Black Rings and Modular Forms” in 2007. Special Borcherds products of these type will play *an important role in arithmetic*. Together with D. Zagier and N.-P. Skoruppa (see [P6]), we proposed a new construction of holomorphic Jacobi forms, so-called *theta-blocks* which generalizes the examples from my papers [45], [47], [65] and [67]. Some of the theta-blocks (for example, the theta-quarks) can be explained using the theory of affine Lie algebras (see [P5]) but this automorphic construction have a hyperbolic explanation (see my last preprint [72]). Using the theta-blocks and Borcherds products we (with C. Poor and D. Yuen) found the first example of antisymmetric Siegel paramodular forms of weight 2 and a prime polarization  $p = 587$ . This result supports the Brumer conjecture (a generalization of Shimura–Taniyama–Weil Conjecture for abelian surfaces).

## 2. LIST of PUBLICATIONS of V. GRITSENKO

1. Symmetric squares of the standard zeta-function for the principle congruence-subgroup of Siegel modular group of genus 2.  
Matem. Sbornik **104** (1977), pp. 22–41;  
English translation: Math. USSR Sbornik **33** (1977), pp. 19–36.  
*Matem. Sbornik is the oldest mathematical journal in Russia which exists since 1866.*
2. Analytic continuation of the symmetric squares.  
Mat. Sbornik **107** (1978), pp. 323–346;  
English translation: Math. USSR Sbornik **35** (1979), pp. 539–614.
3. Symmetric squares of the standard zeta-function for the principle congruence-subgroup of Siegel modular group of genus 2.  
Publication of LOMI R–7–80, “Nauka”, Leningrad, 1980, 12pp. (in Russian).
4. Zeta-functions of Siegel modular forms for principal congruence-subgroups.  
Leningrad Department of the Steklov Mathem. Institute (LOMI), (1980), 112 pp.
5. Fourier-Jacobi expansions of modular forms.  
Transactions of ICM–1982 in Warsaw, sect. 3, Number theory, p. 33.
6. Actions of modular operators on the Fourier–Jacobi coefficients of modular forms.  
Mat. Sbornik **119** (1982), pp. 248–277;  
English translation: Math. USSR Sbornik **47** (1984), pp. 237–268.
7. Recurrent relations in the theory of Hecke operators.  
Zap. Nauchn. Sem. LOMI **125** (1983), pp. 65–74;  
English translation: J. Soviet Math. **26** (1984), pp. 2342–2348.
8. Anillos de Hecke.  
IIMACC La Habana (1984), 110pp. (in Spanish).
9. Algunas propiedades algebraicas del anillo de Hecke triangular de genero uno (avec M. Estrada).  
Ciencias Fisicis y Matematicas La Habana **4** (1984) pp. 49–62.
10. Factorization des los polinomios de Hecke en una extension parabolica (avec J. Estrada).  
Revista de Ciencias Math. La Habana **6** (1985) pp. 2–16.
11. Maass space for  $SU(2,2)$ . Hecke operators and zeta-functions.  
Publication of LOMI R–7–85, “Nauka”, Leningrad, 1985, 23p. (in Russian).
12. Construction of Hermitian modular forms of genus 2 by cusp forms of genus 1.  
Zap. Nauchn. Sem. LOMI **144** (1985), pp. 51–67;  
English translation: J. Soviet Math. **38** (1987), pp. 2065–2078.
13. Hermitian modular forms of genus 2.  
Proceedings of the conference in number theory, “Nauka” Tbilisi, 1985, pp. 54–56.
14. Parabolic extension of the Hecke ring of the general linear group. I.  
Zap. Nauchn. Sem. LOMI **154** (1986), pp. 35–46;  
English translation: J. Soviet Math. **43** (1988), pp. 2533–2539.
15. Zeta-function of degree 6 of Hermitian modular forms of genus.  
Zap. Nauchn. Sem. LOMI **154** (1986), pp. 46–66;  
English translation: J. Soviet Math. **43** (1988), pp. 2540–2559.
16. Dirichlet series with Euler products in the theory of modular forms with respect to orthogonal groups.  
Publication of LOMI, E–11–87, “Nauka”, Leningrad, 1987, 23pp. (in English).



17. Parabolic extensions of the Hecke rings.  
Proceedings of the 19th algebraic congress, “Nauka”, Minsk 1987, p. 124 (in Russian).
18. Arithmetic of quaternions and the Eisenstein series.  
Zap. Nauchn. Sem. LOMI **160** (1987), pp. 82–90;  
English translation: J. Soviet Math. **52** (1990), pp. 3056–3062.
19. Jacobi forms in  $n$  variables.  
Zap. Nauchn. Sem. LOMI **168** (1988), pp. 32–45;  
English translation: J. Soviet Math. **53** (1991), pp. 243–252.
20. Factorization of the Hecke polynomials of classical groups.  
Mat. Sbornik **137** (1988), pp. 328–351;  
English translation: Math. USSR Sbornik **65** (1990), pp. 333–356.
21. Applied algebra.  
Publication of LOMI P–5–89, “Nauka”, Leningrad, 1989, 25pp. (in Russian).
22. Maass space for  $SU(2,2)$ . Hecke operators and zeta-functions.  
Trudy Steklov Math. Inst. **183** (1990), pp. 68–77;  
English translation: Proc. Steklov Inst. of Math. **183** (1991), pp. 75–86.
23. Parabolic extension of the Hecke ring of the general linear group. II.  
Zap. Nauchn. Sem. LOMI **183** (1990), pp. 56–77;  
English translation: J. Soviet Math. **62** (1992), pp. 2863–2882.
24. Jacobi forms and Euler products for the Hermitian modular forms.  
Zap. Nauchn. Sem. LOMI **183** (1990), pp. 77–123;  
English translation: J. Soviet Math. **62** (1992), pp. 2883–2914.
25. Eisenstein series for the hyperbolic group  $SO(1, 4)$ .  
Proceedings of Kuznetsov Workshop, 91-001, Bielefeld University, 1991.
26. Induction in the theory of zeta-functions.  
Algebra i Analiz **6:1** (1994), pp. 2–61;  
English translation: St.Petersburg Math. Journal **6:1** (1995), pp. 1–50.
27. Andrianovsche (Spin)  $L$ -Funktion und Rankin-Selberg Konvolution.  
Publication of Heidelberg University Heft **9** (1993), 15 pp.
28. Eisenstein series on four-dimensional hyperbolic plane (with R. Schulze-Pillot).  
Acta Arithmetica vol. **67** (1994), pp. 241–268.
29. Modular forms and moduli spaces of Abelian and  $K3$  surfaces.  
Algebra i Analiz **6:6** (1994), pp. 65–102;  
English translation: St.Petersburg Math. Journal **6:6** (1995), pp. 1179–1208.
30. Irrationality of the moduli spaces of polarized Abelian surfaces.  
International Mathematics Research Notices **6** (1994), pp. 235–243.
31. Modulformen zur Paramodulgruppe und Modulräume der Abelschen Varietäten.  
Mathematica Gottingensis, Heft **12** (1995), 89 pp.
32. Irrationality of the moduli spaces of polarized Abelian surfaces.  
Abelian varieties. Proceedings of the Egloffstein conference on Abelian varieties  
(Barth, Hulek, Lange, eds.), de Gruyter, Berlin, 1995, pp. 63–82.
33. Appendix to “Irrationality of the moduli spaces of polarized Abelian surfaces”  
(with K. Hulek).  
Abelian varieties. Proceedings of the Egloffstein conference  
(Barth, Hulek, Lange, eds.), de Gruyter, Berlin, 1995, pp. 83–84.
34. Siegel automorphic form correction of a Lorentzian Kac–Moody algebra  
(with V. Nikulin). C. R. Acad. Sci. Paris Sér. A–B **321** (1995) pp. 1151–1156.

35. Arithmetical lifting and its application.  
Number Theory. Proceedings of Paris Seminar (S. David, eds.),  
Cambridge Univ. Press, 1995, pp. 103–126.
36. K3 surfaces, Lorentzian Kac–Moody algebras and Mirror Symmetry (with V. Nikulin).  
Math. Research Letters **3** (1996), pp. 211–229 ;
37. The Igusa modular forms and “the simplest” Lorentzian Kac–Moody algebras  
(with V. Nikulin).  
Matem. Sbornik, **187** (1996), pp. 1601–1643.
38. The geometrical genus of the moduli spaces of Abelian varieties.  
Mathematics in St. Petersburg (Advance in Math. Science, 30),  
AMS Translations, **174**, 1996, pp. 9–20.
39. Moduli of Abelian surfaces with a  $(1, p^2)$  polarization (with G. K. Sankaran).  
Izv. Akad. Nauk of Russia. Ser. Matem. **60:5** (1996).
40. Discriminants of K3 surfaces and Kac–Moody algebras.  
Proceedings of “Arbeitstagung in Bonn”, MPI, Bonn, 1997, 6 pp.
41. Siegel automorphic forms correction of some Lorentzian Kac–Moody Lie algebras  
(with V. Nikulin).  
Amer. Journal of Math. **119** (1997), 181–224.
42. Exponential lifting and Hecke correspondence.  
Research on automorphic forms and zeta functions,  
Proceedings of RIMS Symposium Kokyuroku (Kyoto) **1002** (1997), pp. 119–136.
43. Minimal Siegel modular threefolds (with K. Hulek).  
Math. Proc. of the Cambridge Philos. Society **123** (1998), no. 3, pp. 461–485.
44. Automorphic forms and Lorentzian Kac–Moody algebras. Part I (with V. Nikulin).  
International J. Math. **9:2** (1998), pp. 153–199.
45. Automorphic forms and Lorentzian Kac–Moody algebras. Part II (with V. Nikulin).  
International J. Math. **9:2** (1998), pp. 201–275.
46. Precious Siegel modular forms of genus two.  
Proceedings of the Taniguchi Symposium “*Topological fields theory,  
Primitive forms and related topics*” (M. Kashiwara, ed.)  
Progress in Math., vol. **160**, Birkhauser, Boston, 1998, pp. 177–205.
47. Commutator coverings of Siegel threefolds (with K. Hulek).  
Duke Mathem. Journal **94** (1998), pp. 509–542.
48. Complex vector bundles and Jacobi forms.  
Proceedings of RIMS Symposium “*Automorphic forms*”, vol. **1103**,  
Kyoto, 1999, pp. 71–86; arXiv: math/9906191.
49. The modular form of the Barth–Nieto quintic (with K. Hulek).  
Intern. Math. Res. Notices, N **17** (1999), pp. 915–938.
50. Generalized elliptic genera.  
Proceedings of “Arbeitstagung in Bonn”, MPI, Bonn, 1999, 5 pp.
51. Elliptic genus of Calabi–Yau manifolds and Jacobi forms.  
St. Petersburg Math. Journal **11** (2000), pp. 781–804.
52. Arithmetic Mirror Symmetry and Calabi–Yau manifolds (with V. Nikulin).  
Commun. Math. Phys. **210** (2000), pp. 1–11.
53. A lecture about classification of Lorentzian Kac–Moody algebras of the rank three  
(with V. Nikulin). ArXiv: math/0010329, 26 pp.

54. On classification of Lorentzian Kac–Moody algebras (with V. Nikulin).  
Russian Math. Survey **57** (2002), pp. 921–981.
55. General type of the moduli spaces of K3 surfaces. Proceedings of Arbeitstagung  
of Max-Planck-Institut für Mathematik, Bonn, 2005, 6 pp.
56. The Hirzebruch–Mumford volume for the orthogonal groups and applications  
(with K.Hulek and G.Sankaran).  
Documenta Mathematica **12** (2007), pp. 215–241.
57. Modular forms of small weights and applications to the algebraic geometry.  
European Math. Society, Oberwolfach Reports **4**, Issue 4 (2007), pp. 2999–3001.
58. The Kodaira dimension of the moduli of K3 surfaces (with K.Hulek and G.Sankaran).  
Inventiones Mathematicae **169** (2007), pp. 519–567.
59. Hirzebruch–Mumford proportionality and locally symmetric domains of orthogonal  
type (with K.Hulek and G.Sankaran). Documenta Mathematica **13** (2008), pp. 1–19.
60. Blow up of Cohen–Kuznetsov operator and an automorphic problem of K. Saito.  
Proceedings of RIMS Symposium “Automorphic Representations, Automorphic Forms,  
L-functions, and Related Topics” Kokyuroki **1617** (2008), pp. 83–97.
61. Moduli spaces and Automorphic forms.  
European Math. Society, Oberwolfach Reports **5**, Issue 3 (2008), pp. 2183–2186.
62. Abelianisation of orthogonal groups and the fundamental group of modular varieties  
(with K.Hulek and G.Sankaran).  
Journal of Algebra **322** (2009), no. 2, pp. 463–478.
63. Moduli spaces of irreducible symplectic manifolds  
(with K.Hulek and G.Sankaran).  
Compositio Mathematica **146** (2010), pp. 404–434.
64.  $d = 46, 50, 52, 54, 57$ . Appendix to the paper of A. Peterson, G.K.Sankaran  
“*On some lattice computations related to moduli problems*”.  
Rend. Sem. Mat. Univ. Pol. Torino **68** (3) (2010), pp. 298–299.
65. The Siegel modular forms of genus 2 with the simplest divisor (with F. Cléry).  
Proc. of London Math. Society **102** (2011), pp. 1024–1052.
66. Moduli spaces of polarised symplectic O’Grady varieties and Borchers products  
(with K. Hulek and G.K. Sankaran).  
J. of Differential Geometry **88** (2011), 61–85.
67. Reflective modular forms in algebraic geometry. [ArXiv:1005.3753](https://arxiv.org/abs/1005.3753), 28 pp.
68. Moduli spaces of K3 surfaces and holomorphic symplectic varieties  
(with K. Hulek and G.K. Sankaran). “Handbook of Moduli” (ed. G. Farkas and I. Morrison),  
vol. 1, pp. 459–526; Adv. Lect. in Math, Intern. Press, MA, 2012.
69. Modular forms of orthogonal type and Jacobi theta-series (with F. Cléry).  
Abh. Math. Semin. Univ. Hamburg **83** (2013), 187–217.
70. 24 faces of the Borchers modular form  $\Phi_{12}$ . [ArXiv:1203.6503](https://arxiv.org/abs/1203.6503) (2012), 14 pp.
71. Uniruledness of orthogonal modular varieties (with K. Hulek)  
J. Algebraic Geometry **23** (2014), 711–725.
72. Borchers Products Everywhere (with C. Poor and D. Yuen).  
[ArXiv:1312.6332](https://arxiv.org/abs/1312.6332) (2013), 35 pp., accepted in the Journal of Number Theory.

**Papers in preparation :**

- P0. Solution of Kondo’s problem.
- P1. The baby functions of the Borchers modular form  $\Phi_{12}$  (with B. Grandpierre).

- P2.** Automorphic discriminants of the exceptional Arnold singularities.
- P3.** Uniruled moduli spaces of generalized Kummer varieties (with K. Hulek).
- P4.** Moduli spaces of polarized Enriques surfaces (with K. Hulek).
- P5.** Denominator functions of affine Lie algebras and modular forms (with K. Iohara).
- P6.** Theta-blocks and applications (with N.-P. Skoruppa and D. Zagier).  
Manuscript 2012.
- P7.** Theta-products and Siegel modular forms of weight 2 (with C. Poor and D. Yuen).
- P8.** A new class of Lorentzian Kac–Moody algebras (with V. Nikulin).  
Manuscript 2013.
- P9.** New modular generalizations of elliptic genera.
- P10.** Moduli spaces of holomorphic symplectic varieties with non-split polarisations  
(with K. Hulek and G. Sankaran).
- P11.** Congruence subgroups of classical groups and Fricke’s involutions.
- P12.** Jacobi-Eisenstein series and new additive formulae for some infinite products.
- PB1.** A constructive theory of Siegel modular forms.  
A book for Springer in preparation.
- PB2.** Jacobi form II (together with D. Zagier and N.-P. Skoruppa).  
A book for Birkhauser in preparation.