NEWSLETTER

FALL 2025 ICMS.BG

IN THIS ISSUE:

- A YEAR OF GROWTH AND GLOBAL COLLABORATION

- SCIENTIFIC HIGHLIGHTS & RESEARCH BREAKTHROUGHS

- SCIENTIFIC EVENTS 2025

- LOOKING AHEAD - ICMS'S UPCOMING EVENTS

ICMS-SOFIA: BUILDING A STRONG MATHEMATICAL FUTURE

- ▶▶ Hired outstanding researchers
- ▶▶ Achieved strong results
- ▶▶ Strengthened scientific community in Bulgaria

THE INTERNATIONAL CENTER FOR MATHEMATICAL SCIENCES – SOFIA (ICMS-SOFIA), HOSTED BY THE INSTITUTE OF MATHEMATICS AND INFORMATICS AT THE BULGARIAN ACADEMY OF SCIENCES, CONTINUES TO ESTABLISH ITSELF AS A REGIONAL HUB FOR WORLD-CLASS RESEARCH.

A Year of Growth and Global Collaboration

The International Center for Mathematical Sciences – Sofia (ICMS-Sofia), hosted by the Institute of Mathematics and Informatics (Bulgarian Academy of Sciences), continues to establish itself as a regional hub for world-class research.

In 2024–2025, we saw significant progress in forming three research groups and strengthening global partnerships.

Three Research Groups Successfully Launched:

- **THEORY OF ATOMS**

CHAIR: PROF. LUDMIL KATZARKOV

- **QUANTUM GROUPS & CLUSTER ALGEBRAS**

CHAIR: PROF. MILEN YAKIMOV

- **TOPOLOGICAL, COMPUTATIONAL & ALGEBRAIC ASPECTS OF COMPLEX SYSTEMS**

CHAIR: PROF. ERNESTO LUPERCIO

RESEARCH GROUP

THEORY OF ATOMS

Led by Prof. Ludmil Katzarkov from the Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences and the University of Miami

Ludmil Katzarkov is a full professor at the University of Miami and the Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences. He is an algebraic geometer known for his fundamental contributions to the topological study of Kaehler spaces, Hodge theory, and mirror symmetry.

He earned his Master's degree in Mathematics at Moscow University with master thesis supervised by V. Iskovskich. In 1995, he completed his PhD in Mathematics at the University of Pennsylvania with PhD Advisor R. Donagi. Since 2022, Ludmil Katzarkov is a member of the Academia Europaea. In 2024, he was elected Corresponding Member of the Bulgarian Academy of Sciences.

Katzarkov has organized more than 40 conferences, schools, and workshops, and has mentored and attracted many young people to research in geometry, symplectic topology, and mirror symmetry. He was a supervisor of 11 PhD students and supervised at least 30 postdocs.

THEORY OF ATOMS WAS INTRODUCED BY L. KATZARKOV, M. KONTSEVICH AND COLLABORATORS IN 2017. BY NOW IT IS CLEAR THAT THE THEORY OF ATOMS WILL LEAD TO MAJOR NEW RESULTS IN BIRATIONAL GEOMETRY.

THE GOALS OF THE THEORY OF ATOMS GROUP ARE:

- OBTAIN NEW BIRATIONAL RESULTS.
- EXPLORE APPLICATIONS OF THEORY OF ATOMS TO G NONRATIONALITY.
- EXPLORE A SIDE APPLICATIONS OF THEORY OF ATOMS.

RESEARCH GROUP
THEORY OF ATOMS
TEAM

LEONARDO F. CAVENAGHI

Leonardo obtained his Master's degree in Mathematics at the University of Campinas. In 2020, he completed his PhD in Mathematics at the University of São Paulo. He is a young researcher with extensive international experience, including Post-doctorates at the University of Miami (USA) & the University of Fribourg (Switzerland). He is the winner of the awards for best doctoral thesis defended in 2020: Carlos Gutierrez and CAPES Thesis Award. Leonardo is an expert in Differential and Complex geometry - group actions.

An R3 - Established Researcher, he will work on developing of G atoms and CR atoms.

ERIK PAEMURRU

Erik Paemurru obtained his PhD in Algebraic Geometry from Loughborough University. His thesis entitled "Birational models of terminal sextic double solids" was supervised by Dr Hamid Abban. Erik Paemurru was a Postdoctoral Research Associate in Saarland University under the supervision of Prof. Simon Brandhorst. His research interests lie in Birational geometry, more specifically the birational classification of singular Fano 3-folds, singularity theory and computer algebra, often combining all three.

An R2 - Recognised researcher, he will study the connection of spectra with Theory of Atoms.

RESEARCH GROUP
THEORY OF ATOMS
TEAM

GIOVANE GALINDO

Giovane Galindo completed his Master's degree at UFPE (Federal university of Pernambuco) and his PhD at UNICAMP (State University of Campinas). He is a young researcher focused on differential geometry with particular interest in the topics of almost-complex geometry, homogeneous spaces, geometric flows and Gromov-Hausdorff distance. Giovane Galindo is an expert on group actions.

An R2 - Recognised researcher, he will study the connection of spectra with Theory of Atoms.

ROY MAGEN

Roy Magen graduated from Columbia University under the leadership of Andrew Blumberg and Aise Johan de Jong. He is educated in high category theory. Most of his research is about motivic homotopy theory, which blends homotopy theory with algebraic geometry.

Roy Magen explores the connection of CR atoms with K theoretic and high category invariants.

An R2 - Recognised researcher, he will explore the connection of CR atoms with K theoretic and high category invariants.
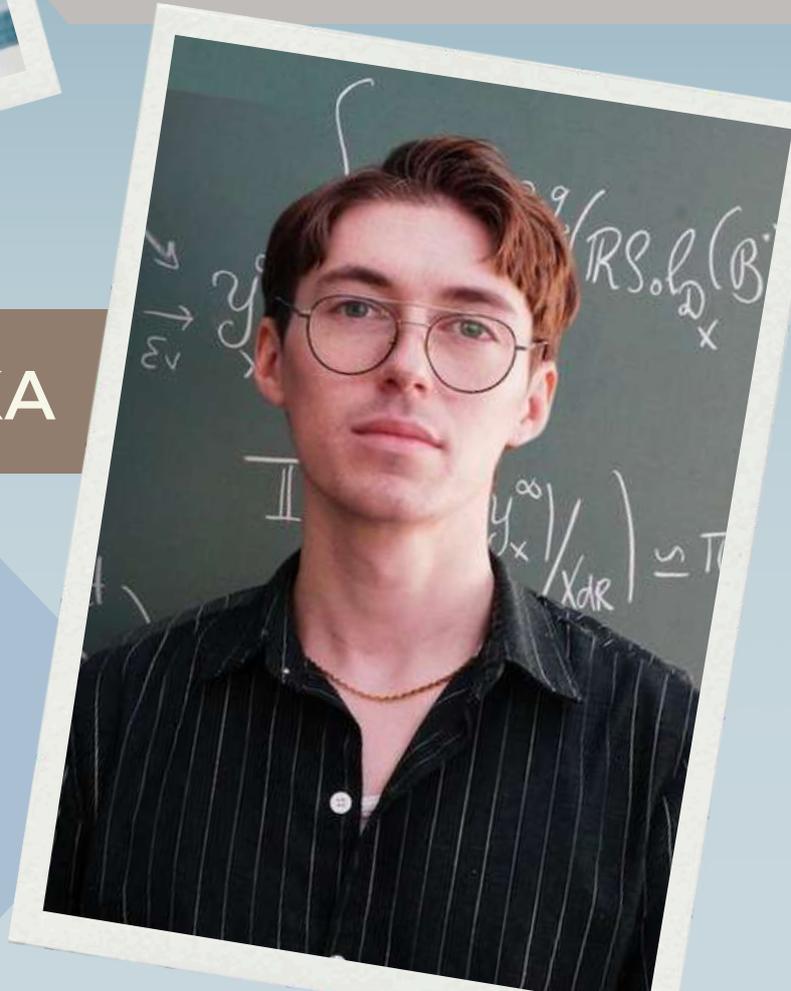
RESEARCH GROUP
THEORY OF ATOMS
TEAM

ALEXANDER NOVIKOV

Alexander Novikov completed his PhD at the Higher School of Economics in Moscow under the supervision of Alexander Kuznetsov, specializing in the derived categories of homogeneous spaces. His research experience equips him with the tools for detailed analysis and the construction of explicit examples.

As a Recognised Researcher (R2), he will leverage this expertise to advance the Theory of Atoms by exploring how new concepts and invariants manifest in specific classes of varieties.

JACOB KRYCZKA

J. Kryczka received his PhD from LAREMA, University of Angers, under the supervision of Prof. V. Rubtsov and Prof. A.M Vinogradov, and subsequently held a postdoctoral position at the Beijing Institute of Mathematical Sciences and Applications (BIMSA), where he was mentored by Prof. A. Sheshmani and Prof. S-T. Yau.

Currently an R2 Researcher, he will develop the Theory of Atoms by studying birational applications of differential-algebraic structures from the point of view of derived geometry of non-linear PDES
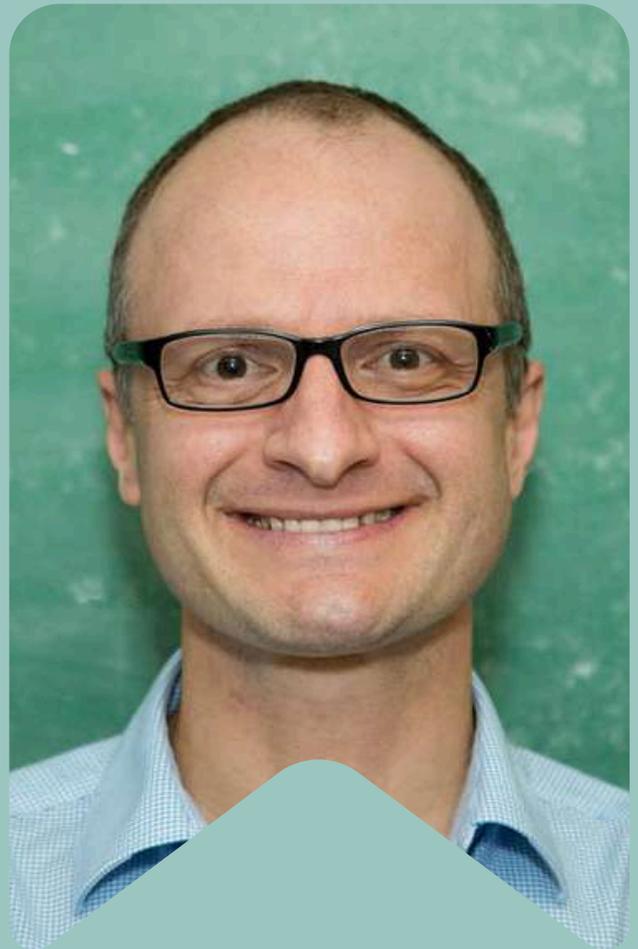
RESEARCH GROUP
QUANTUM GROUPS AND CLUSTER ALGEBRAS

Chair Prof. Milen Yakimov, Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences and the Northeastern University

Professor Milen Yakimov is renowned for his contributions to noncommutative algebra, representation theory, and cluster algebras. He received his undergraduate degree in Mathematics from Sofia University, Bulgaria, in 1996, and completed his PhD at the University of California, Berkeley, in 2001. His research explores the deep connections between noncommutative algebra, triangulated categories, Poisson geometry, and integrable systems, placing him at the forefront of modern algebraic research.

Throughout his career, Professor Yakimov has been recognized with several prestigious honors, including a Sloan Research Fellowship in 2005 and election as a Fellow of the American Mathematical Society in 2018. His research has been continuously supported by the National Science Foundation since 2004, reflecting the sustained impact of his work in the mathematical sciences. At Northeastern, he is an integral member of the algebra group, contributing to a vibrant research community that engages with areas such as algebraic geometry, quantum groups, and their applications to combinatorics, topology, and physics.

THE GROUP WORKING IN QUANTUM GROUPS AND CLUSTER ALGEBRAS FOCUSES ON SEVERAL MAJOR LINES OF PROJECTS ADDRESSING KEY OPEN PROBLEMS IN THE TWO AREAS. THE GROUP SEEKS TO UNDERSTAND THE STRUCTURE OF FINITE TENSOR CATEGORIES AND THEIR STABLE TRIANGULATED CATEGORIES. THE GROUP INVESTIGATES THE PROPERTIES OF BRAIDED TENSOR CATEGORIES AND THEIR MODULE CATEGORIES, AND ON THE ALGEBRA LEVEL, THE STRUCTURE OF QUASITRIANGULAR COMODULE ALGEBRAS AND COIDEAL SUBALGEBRAS OF QUASITRIANGULAR HOPF ALGEBRAS. THIS HAS IMPORTANT APPLICATIONS TO TOPOLOGICAL QUANTUM FIELD THEORY AND QUANTUM SYMMETRIC SPACES.

RESEARCH GROUP
QUANTUM GROUPS AND CLUSTER ALGEBRAS
TEAM

EMINE YILDIRIM

Emine Yıldırım obtained her PhD from Université du Québec à Montréal in 2018 under the supervision of Professor Hugh.

She was awarded the highly selective Simons Postdoctoral Fellowship at the Isaac Newton Institute & University of Cambridge, UK between October 2021 and September 2022. Before coming to ICMS, between October 2022 and July 2025, she was a Research Fellow at the University of Leeds, UK.

Yildirim's research interests are in the field of representation theory of algebras, cluster algebras and related combinatorics which includes surface triangulations, friezes, lattices, dynamical actions.
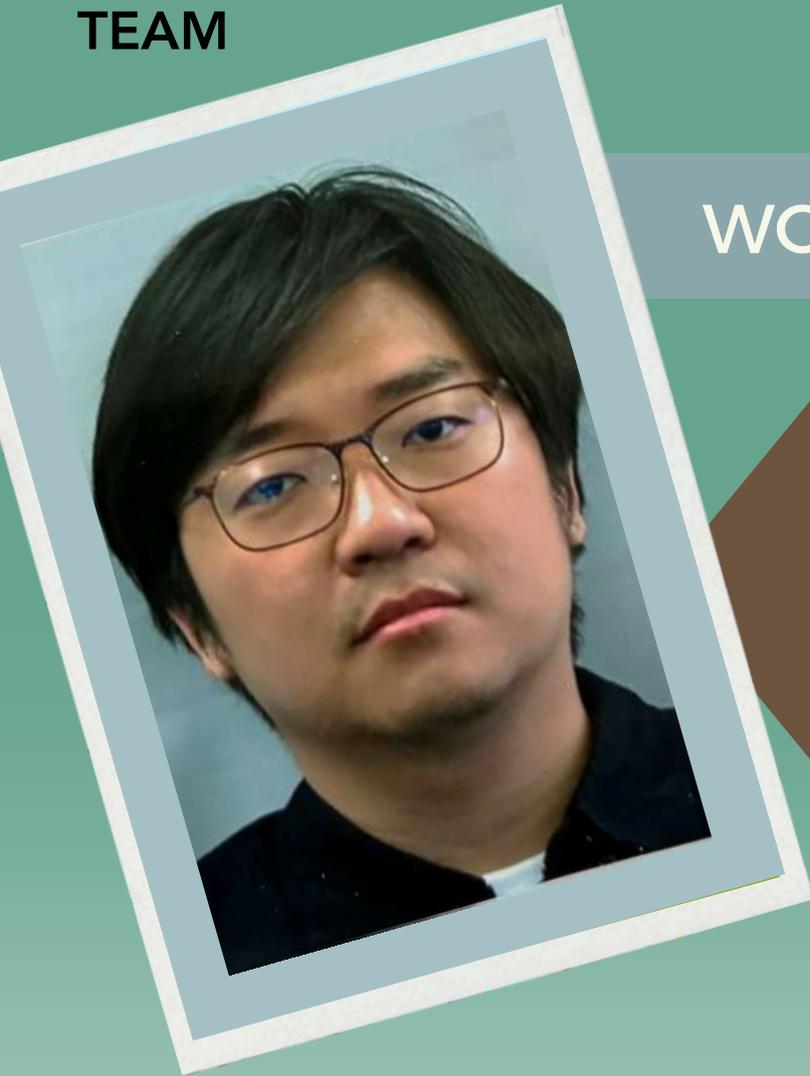
DEEPANSHU PRASAD

Deepanshu Prasad received his PhD in Mathematics from Queen's University, Canada in 2025 under Charles Paquette and David Wehlau. His research explores the connection between representation theory, algebraic geometry, and cluster algebras, with contributions to the structure of semi-invariant rings, quiver representations, and mutations. He co-authored preprints extending the Sato-Kimura theorem and establishing new results on Galois coverings and τ-rigidity.

His trajectory is marked by multiple competitive awards including the Norman and Grace Miller Fellowship and Queen's University Research Fellowship.

RESEARCH GROUP
QUANTUM GROUPS AND CLUSTER ALGEBRAS
TEAM

WONWOO KANG

Wonwoo Kang earned his PhD in Mathematics at the University of Illinois at Urbana-Champaign (UIUC) under the supervision of Professor Rinat Kedem. His research focuses on cluster algebras and their connections to combinatorics and algebraic geometry. Kang's recent work involves developing combinatorial formulas and skein relations for elements in cluster algebras arising from punctured surfaces. Another line of his recent research investigates unimodal structures in F-polynomials associated with surface-type cluster algebras, revealing new combinatorial links with poset theory.

NICOLA BELLUMAT

Nicola Bellumat received his PhD from the University of Sheffield, UK in 2021. During his postgraduate studies his research focus was in algebraic topology: more precisely, chromatic homotopy theory and Bousfield localization. Bellumat carried out his first postdoctoral position at the Aarhus University, Denmark and his interests moved towards tensor triangulated categories and their theory of stratification via Balmer-Favi support recently developed by Barthel, Heard and Sanders.
Currently, he is working on the relation between the local-to-global principle and the topology of the Balmer spectrum.

RESEARCH GROUP

TOPOLOGICAL, COMPUTATIONAL, AND ALGEBRAIC ASPECTS OF COMPLEX SYSTEMS

Chair: Ernesto Lupercio, Institute of Mathematics and Informatics, Bulgarian Academy of Sciences and CINVESTAV

Ernesto Lupercio first gained recognition representing Mexico at the 1987 International Mathematical Olympiad and co-authored his first book at the age of 17. He earned his Bachelor's in Physics and Mathematics from the National Polytechnic Institute and completed his PhD at Stanford University under the supervision of Ralph Cohen, contributing early on to solving a long-standing conjecture in algebraic topology with Cohen and Graeme Segal.

He held academic positions at the Max Planck Institute, University of Michigan, and University of Wisconsin–Madison, where he worked on orbifolds, gerbes, and motivic integration, resolving key conjectures by Witten and Ruan. Back in Mexico, he developed string topology research with collaborators and secured major funding from institutions like the US National Science Foundation.

Lupercio has received international recognition, including the ICTP Ramanujan Prize (2010) and the Marcos Moshinsky Research Award (2013). He was named a Young Global Leader in Science by the World Economic Forum in 2007. He has mentored numerous graduate students and served as Vice President of the Mexican Mathematical Society. He currently acts as Senior Executive Liaison for Global Outreach at the Institute of the Mathematical Sciences of the Americas, University of Miami.

THE RESEARCH GROUP EXPLORES THE INTRICATE RELATIONSHIPS BETWEEN TOPOLOGY, ALGEBRA, AND COMPUTATION IN THE CONTEXT OF COMPLEX SYSTEMS. THE AIM IS TO UNCOVER STRUCTURES THAT TRANSCEND THE BOUNDARIES OF CLASSICAL DISCIPLINES AND TO DEVELOP FRAMEWORKS THAT REFLECT THE INTRINSIC UNITY OF MODERN MATHEMATICS.

RESEARCH GROUP
TOPOLOGICAL, COMPUTATIONAL, AND ALGEBRAIC ASPECTS OF COMPLEX SYSTEMS
TEAM

MIKHAIL SHKOLNIKOV

Mikhail Shkolnikov received his PhD from the University of Geneva, Switzerland, under the supervision of Grigory Mikhalkin. His research interests are in the field of Geometry, Topology, Combinatorics, Number Theory, Mathematical Physics. Shkolnikov has strong geometric and combinatorial expertise. His work combines Tropical geometry, Combinatorial group structures, Algorithmic implementations.

Misha Shkolnikov has done a pioneering research in Tropical Sandpile Geometry. He has made foundational contributions to the algebraic and tropical understanding of sandpilemodels, offering deep insights into self-organized criticality.

HIGINIO SERRANO

Higinio Serrano received his PhD in Mathematics in March 2025 from the Center for Research and Advanced Studies (CINVESTAV), Mexico, under the supervision of Bernardo Uribe Jongbloed and Miguel Alejandro Xicoténcatl Merino. Higinio Serrano has strong expertise in algebraic topological K-theory. He has also shown a broad interplay with geometric and physical contexts. Together with colalborators, he constructed topological invariants for magnetic materials, combining equivariant K-theory and Hamiltonian models to yield robust physical predictions.

RESEARCH GROUP
TOPOLOGICAL, COMPUTATIONAL, AND ALGEBRAIC ASPECTS OF COMPLEX SYSTEMS
TEAM

TURGAY AKYAR

Turgay Akyar completed his PhD thesis entitled "On Special Linear Systems on Real Trigonal curves" in September 2024 and obtained his PhD degree from the Middle East Technical University, Turkey. His research is focused on real Brill–Noether theory, namely the investigation of special linear systems on real algebraic curves.

He has been studying higher dimensional Brill–Noether varieties that parametrize linear systems on real algebraic curves, and one motivation for the interest in this field is related to Hilbert's 16th problem.

POSTDOCTORAL RESEARCHERS AND VISITING SCHOLARS ARE INTEGRATED INTO THE CORE OF THE GROUP'S ACTIVITY. THE ENVIRONMENT SUPPORTS BOTH INDEPENDENT WORK AND COLLABORATIVE PROJECTS. REGULAR INTERACTION WITH PARTNER INSTITUTIONS — INCLUDING LAREMA IN ANGERS AND OTHER CENTERS IN FRANCE, MEXICO (CINVESTAV), AND THE US (IMSA, MIAMI) — FACILITATES LONG-TERM COLLABORATIONS AND RESEARCH MOBILITY.
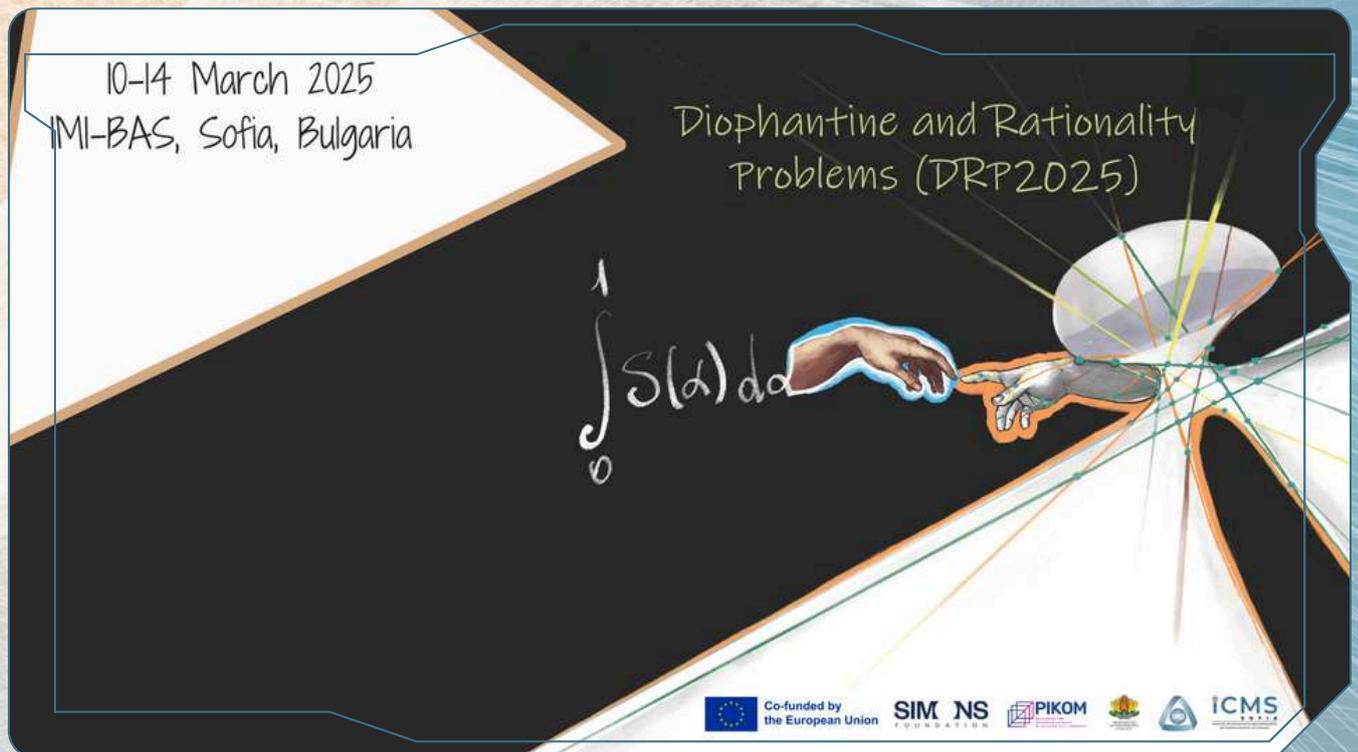
SCIENTIFIC
Events
2025

DIOPHANTINE AND RATIONALITY PROBLEMS (DRP2025)

MARCH 10 – 14, 2025
SOFIA, BULGARIA

The conference explored the newest developments around classical qualitative and quantitative questions for rational, integral, Campana and related notions of points on schemes and stacks, together with new insights on rationality questions over non-closed fields.

The conference was part of Horizon Europe MSCA Postdoctoral Fellowship project "Generalised Integrality and Applications to Number Theory" with PI Vladimir Mitankin, funded by the European Union, Grant agreement 101151205 – GIANT.

The event was organized by ICMS-Sofia and was supported by Simons Foundation, the European Union and the Ministry of Education and Science of Bulgaria through the Scientific Programme "Enhancing the Research Capacity in Mathematical Sciences" (PIKOM).
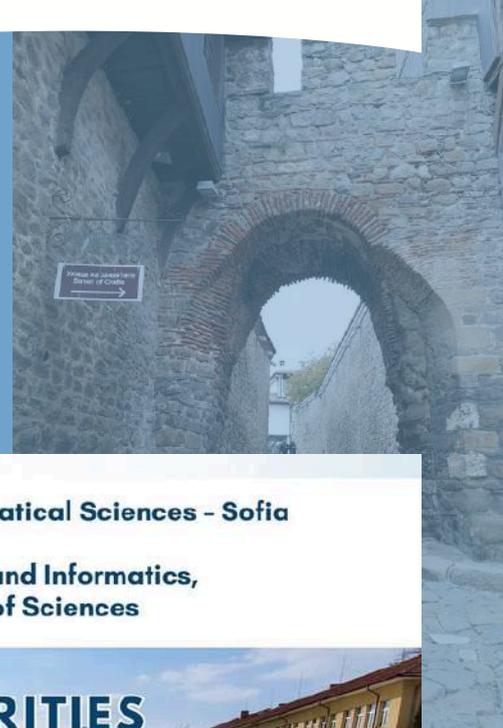

You will find more details at https://icms.bg/diophantine-and-rationality-problems-drp2025/

Supported by: **SIMONS FOUNDATION**

INTERNATIONAL CONFERENCE "SINGULARITIES IN PLOVDIV"

JUNE 8 – 13, 2025
PLOVDIV, BULGARIA

The goal of the conference was to bring together world-renowned and early-career researchers working in the field of algebraic geometry, low-dimensional topology, complex geometry and commutative algebra and foster discussions around singularities in topology, metric geometry, algebraic geometry, dynamical systems and mirror symmetry. The meeting also provided an opportunity for young scholars from Eastern Europe to engage with cutting edge research in the area.

International Center for Mathematical Sciences - Sofia

Institute of Mathematics and Informatics, Bulgarian Academy of Sciences

SINGULARITIES in PLOVDIV

International Conference
June 8 – 13, 2025
Plovdiv, Bulgaria

Organizing Committee:
Bernard Teissier, IMJ-PRG, CNRS
Hussein Mourtada, IMJ-PRG
Antoni Rangachev, IMJ-PRG, CNRS, IMI-BAS
Velichka Milousheva, IMI-BAS

Speakers:

NORBERT A'CAMPO, UNIVERSITÄT BASEL
FUENSANTA AROCA, UNEVERSIDAD NACIONAL AUTÓNOMA DE MÉXICO
ANDRÉ BELOTTO DA SILVA, UNIVERSITÉ PARIS CITÉ
ANDREI BENGUS-LASNIER, IMI-BAS
MORGAN BROWN, UNIVERSITY OF MIAMI
STEVEN DALE CUTKOSKY, UNIVERSITY OF MISSOURI
ELEONORE FABER, UNIVERSITY OF GRAZ
PEDRO GONZÁLEZ PÉREZ, UNIVERSIDAD COMPLUTENSE MADRID
PAUL HORJA, UNIVERSITY OF MIAMI, IMI-BAS
TAMÁS LÁSZLÓ, BABEŞ-BOLYAI UNIVERSITY, CLUJ-NAPOCA
DAVID MASSEY, NORTHEASTERN UNIVERSITY

MIRCEA MUSTAŢĂ, UNIVERSITY OF MICHIGAN
MARÍA PE PEREIRA, UNIVERSIDAD COMPLUTENSE MADRID
ANNE PICHON, INSTITUT DE MATHÉMATIQUES DE MARSEILLE
PATRICK POPESCU-PAMPU, UNIVERSITÉ DE LILLE
PABLO PORTILLA, UNIVERSIDAD POLITÉCNICA DE MADRID
MATTEO RUGGIERO, IMJ-PRG
EDSON SAMPAIO, UFC, BRAZIL
MARK SPIVAKOVSKY, INSTITUT DE MATHÉMATIQUES DE TOULOUSE
WIM VEYS, KU LEUVEN
JAROSLAW WŁODARCZYK, PURDUE UNIVERSITY

ICMS SOFIA · REPUBLIC OF BULGARIA Ministry of Education and Science · SIMONS FOUNDATION

PIKOM · IMJ-PRG · Swiss National Science Foundation

https://icms.bg/singularities-in-plovdiv-2025/

Celebrating the Consortium IMSAC
International Conference

August 7-9, 2025

Sofia, Bulgaria

Jointly organized by ICMS-Sofia and IMSA

This international meeting was a testament to the strength of global academic partnerships and the growing role of ICMS-Sofia as a center for high-level mathematical research. The event reaffirmed ICMS-Sofia's mission to foster scientific excellence and international collaboration within the framework of IMSAC.

NEW DEVELOPMENTS ON ARNOLD'S CONJECTURE
WORKSHOP

August 16–17, 2025
Sofia, Bulgaria

More on

Speakers:

- **Kenji Fukaya**, Beijing Institute of Mathematical Sciences and Applications, China
- **Leonardo Francisco Cavenaghi,** IMI–BAS, Bulgaria, and University of Miami, USA
- **Llohann Dallagnol Sperança**, Leonardo Centre on Business for Society, Imperial College London, UK
- **Yakov Eliashberg**, Stanford University, USA

INTERNATIONAL CONFERENCE
GEOMETRY at LARGE

AUGUST 11–14
2025

BURGAS
BULGARIA

SPEAKERS

ARTAN SHESHMANI, HARVARD UNIVERSITY- MIT IAIFIQ USA, AND BIMSA, CHINA
DANIEL POMERLEANO, UNIVERSITY OF MASSACHUSETTS, USA
DENNIS BORISOV, UNIVERSITY OF WINDSOR, CANADA
ERNESTO LUPERCIO, INSTITUTE OF MATHEMATICS AND INFORMATICS, BULGARIA, AND CINVESTAV-IPN, MEXICO
FILIP ZHIVANOVIC, SIMONS CENTER FOR GEOMETRY AND PHYSICS, STONY BROOK, USA
GRIGORY MIKHALKIN, UNIVERSITY OF GENEVA, SWITZERLAND
GUEO GRANTCHAROV, INSTITUTE OF MATHEMATICS AND INFORMATICS, BULGARIA, AND FLORIDA INTERNATIONAL UNIVERSITY, USA
JOHN MORGAN, COLUMBIA UNIVERSITY, USA
KENJI FUKAYA, BEIJING INSTITUTE OF MATHEMATICAL SCIENCES AND APPLICATIONS, CHINA
LEONARDO FRANCISCO CAVENAGHI, INSTITUTE OF MATHEMATICS AND INFORMATICS, BULGARIA, AND UNIVERSITY OF MIAMI, USA
LEONID POLTEROVICH, TEL AVIV UNIVERSITY, ISRAEL
LINO GRAMA, UNIVERSITY OF CAMPINAS - UNICAMP, BRAZIL
LJUDMILA KAMENOVA, STONY BROOK UNIVERSITY, USA
MISHA SHKOLNIKOV, INSTITUTE OF MATHEMATICS AND INFORMATICS, BULGARIA
NIKITA NEKRASOV, SIMONS CENTER FOR GEOMETRY AND PHYSICS, STONY BROOK, USA
PHILLIP GRIFFITHS, INSTITUTE FOR ADVANCED STUDY, USA
ROBERT BRYANT, DUKE UNIVERSITY, USA
SEMON REZCHIKOV, PRINCETON UNIVERSITY, USA
STEFAN IVANOV, SOFIA UNIVERSITY AND INSTITUTE OF MATHEMATICS AND INFORMATICS, BULGARIA
TANCREDI SCHETTINI GHERARDINI, QUEEN MARY UNIVERSITY OF LONDON
YAKOV ELIASHBERG, STANFORD UNIVERSITY, USA
YAN SOIBELMAN, KANSAS STATE UNIVERSITY, USA

Geometry and Physics of Higgs Moduli

Workshop In Algebraic Geometry and Physics 2025

September 1–5, 2025

Katarino Spa Hotel, RAZLOG, BULGARIA

Organizers

- **Ugo Bruzzo,** SISSA, Italy
- **Peter Dalakov,** AUBG and IMI-BAS, Bulgaria
- **Ludmil Katzarkov**, IMI-BAS, Bulgaria and University of Miami, USA
- **Velichka Milousheva,** IMI-BAS, Bulgaria

About the Workshop

The twentieth installment of a sequence of distinguished workshops and schools that has been organized since 1996 by the Mathematical Physics and Geometry group of the International School for Advanced Studies in Trieste in collaboration with leading institutions worldwide.

Invited Speakers

Luis Álvarez-Consul, ICMAT-CSIC, Spain
Oren Ben-Bassat, University of Haifa, Israel
Indranil Biswas, Shiv Nadar University, India
Giordano Cotti, Universidade de Lisboa, Portugal
Sourav Das, Chennai Mathematical Institute, India
Nadir Fasola, SISSA, Trieste, Italy
Ilia Gaiur, Institut des Hautes Études Scientifiques, France
Michele Graffeo, SISSA, Trieste, Italy

Gueo Grantcharov, Florida International University, USA
Alessia Mandini, Università di Verona, Italy
Tony Pantev, University of Pennsylvania, USA
Volodya Rubtsov, Université d'Angers, France
Francesco Sala, Università di Pisa, Italy
Richard Szabo, Heriot-Watt University, Scotland
Szilárd Szabó, Eötvös Loránd University, Hungary
Valdemar Tsanov, Institute of Mathematics and Informatics, BAS, Bulgaria

Supported By

SISSA — Scuola Internazionale Superiore di Studi Avanzati

AMERICAN UNIVERSITY IN BULGARIA

REPUBLIC OF BULGARIA — Ministry of Education and Science

PIKOM — ENHANCING THE RESEARCH CAPACITY IN MATHEMATICAL SCIENCES

SIMONS FOUNDATION

Find out more

https://icms.bg

ENTANGLEMENTS OF
LOGIC, DATA, AND COMPLEXITY

SYMPOSIUM

How do knots teach us about data?

Can sandpiles inform, through complex systems, a deeper understanding of mathematical logic?

What lies beyond the Church–Turing boundary in our age of quantum algorithms and polymodels?

Our sessions will feature four intersecting threads:

- Young Talents, sharing emerging directions at the intersection of topology and data science.
- Core Researchers from the local Complex Sandpile Group at the ICMS presenting their recent results.
- Senior Established Mathematicians, offering insights into foundational and future-facing work.
- Industry Thought Leaders, reflecting on applied complexity in the real world.

November 8–11, 2025

Sofia, Bulgaria

Organized by the **Research Group on Topological, Computational, and Algebraic Aspects of Complex Systems**, hosted at the
Institute of Mathematics and Informatics, Bulgarian Academy of Sciences
and supported by

LMI

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BULGARIAN ACADEMY OF SCIENCES

REPUBLIC OF BULGARIA
Ministry of Education and Science

PIKOM
ENHANCING THE
RESEARCH CAPACITY
IN MATHEMATICAL SCIENCES

SIMONS
FOUNDATION

ATANASOFF MEMORIAL DAY

Mathematics and Machine Learning

November 10, 2025
ICMS-Sofia, Bulgaria

ATANASOFF KEYNOTE LECTURE

AMAURY HAYAT

French mathematician and applied scientist, Professor at École des Ponts – Institut Polytechnique de Paris, working on control and stabilization of PDEs and on applications of artificial intelligence to mathematics.

THE ATANASOFF MEMORIAL LECTURE SERIES

The Atanasoff Memorial Lecture Series is a new annual program of the Bulgarian Academy of Sciences and ICMS Sofia celebrating the intersection of mathematics, computation, and the sciences of complexity — the very domains that unite topology, geometry, and machine learning in the 21st century.

It honours John Vincent Atanasoff (1903–1995), inventor of the first electronic digital computing device — the Atanasoff–Berry Computer (ABC) — whose Bulgarian heritage and pioneering ideas transformed modern computation.

PUBLIC LECTURE

THE ALGEBRA OF AVALANCHES

FROM SANDPILES TO THE HIDDEN SYMMETRIES OF THE UNIVERSE

RAMANUJAN PRIZE LAUREATE

ERNESTO LUPERCIO

PROFESSOR, IMI-BAS & CINVESTAV

November 10, 2025
10:00 am (EET)
ICMS–Sofia, Bulgaria

RECENT DEVELOPMENTS IN MODERN

HODGE THEORY

Workshop
December 5-12, 2025

INTERNATIONAL CENTER FOR MATHEMATICAL SCIENCES – SOFIA
INSTITUTE OF THE MATHEMATICAL SCIENCES OF THE AMERICAS – MIAMI

Speakers:

ALEKSANDR **NOVIKOV**
ERNESTO **LUPERCIO**
FELIPE **ESPREAFICO GUELERMAN**
GIOVANE **GALINDO NETO**
GUEO **GRANTCHAROV**
LAURENT **MEERSSEMAN**
LEONARDO FRANCISCO **CAVENAGHI**
LINO **GRAMA**
LUDMIL **KATZARKOV**
MATTHIEU **MADERA**
MAXIM **KONTSEVICH**
MAXIM **SMIRNOV**
NICOLETTA **TARDINI**
PEDRO ANTONIO **MUNIZ MARTINS**
PHILIP **CANDELAS**
RICHARD-PAUL **HORJA**
SEMON **REZCHIKOV**
STEFAN **IVANOV**
STEFAN **SCHREIEDER**
VALDEMAR **TSANOV**

HOSTED BY:
INSTITUTE OF MATHEMATICS AND INFORMATICS
BULGARIAN ACADEMY OF SCIENCES
SOFIA. ACAD. GEORGI BONCHEV STR.. BLOCK 8
HALL 403

Photo credit: London Institute for Mathematical Sciences

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INSTITUTE OF MATHEMATICS AND INFORMATICS
BULGARIAN ACADEMY OF SCIENCES

IMSA
INSTITUTE OF THE MATHEMATICAL
SCIENCES OF THE AMERICAS
AT THE UNIVERSITY OF MIAMI

REPUBLIC OF BULGARIA
Ministry of Education and Science

SIMONS FOUNDATION

QUANTUM GROUPS AND CLUSTER ALGEBRAS

INTERNATIONAL CONFERENCE
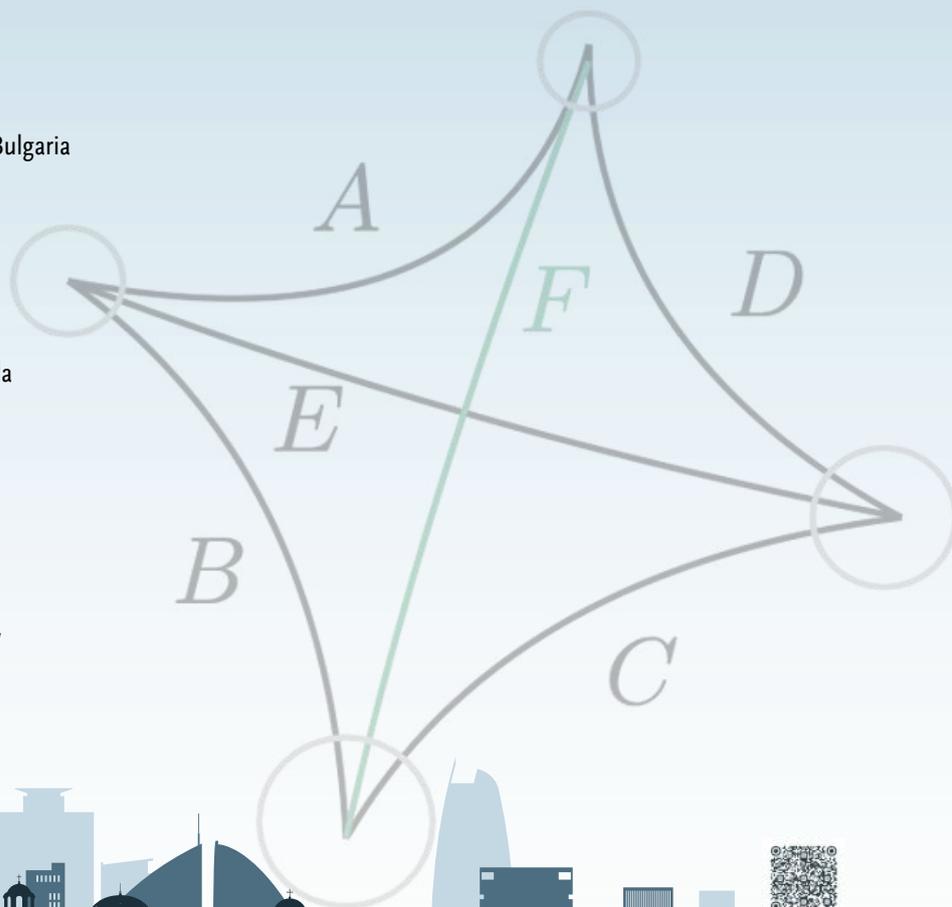### DECEMBER 15–19, 2025

INTERNATIONAL CENTER FOR MATHEMATICAL
SCIENCES–SOFIA, BULGARIA

SPEAKERS

Karin Baur, Ruhr-Universität Bochum
Nicola Bellumat, ICMS – Sofia
Alessandro Contu, Kyoto University
İlke Çanakçı, Vrije Universiteit Amsterdam
Ben Davison, University of Edinburg
Ivan Dimitrov, Queen's University
Pavel Etingof, MIT (tbc)
Tatyana Gateva-Ivanova, American University in Bulgaria
Iain Gordon, University of Edinburgh
Wonwoo Kang, ICMS – Sofia
Stefan Kolb, Newcastle University
Robert Laugwitz, University of Nottingham
Valentin Ovsienko, CNRS – Reims
Charles Paquette, Royal Military College of Canada
Deepanshu Prasad, ICMS – Sofia
Nicolai Reshetikhin, BIMSA (tbc)
Siddhartha Sahi, Rutgers University
Hadi Salmasian, University of Ottawa
Alexander Shapiro, University of Edinburg
Gordana Todorov, Northeastern University
Valerio Toledano Laredo, Northeastern University
Kent Vashaw, University of California

ORGANIZERS

MILEN YAKIMOV
EMINE YILDIRIM

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Upcoming Events

- **Modern Methods in Nonlinear Elliptic and Parabolic PDE**, 2nd Edition, May 25 – 29, 2026, Veliko Turnovo, Bulgaria

- **ICMS Computational Neuroscience Workshop**, June 2026, Sofia, Bulgaria

- **17-th International Workshop on Well-Posedness of Optimization Problems and Related Topics**, July 2026, Borovets, Bulgaria

- **International Conference "Geometry at Large"**, August 2026, Burgas, Bulgaria

- **Educational workshop "Recent Developments in the Theory of Atoms"**, August 2026, Sofia, Bulgaria

- **Atanasoff Memorial Day,** November 2026, Sofia, Bulgaria

- **Symposium on Complex Systems, Data, and Topology,** November 2026, Sofia, Bulgaria

- **International Conference Quantum Groups and Cluster Algebras,** December, 2026, Sofia, Bulgaria