INTERNATIONAL CONFERENCE ON

COMPLEX HYPERBOLICITY, FUNCTION FIELDS AND NON-ARCHIMEDEAN ARITHMETIC

June 16 - 19, 2026

Hanoi, Vietnam

PROGRAM
&
ABSTRACTS

Vietnam Institute for Advanced Study in Mathematics
and Institute of Mathematics - VAST

Objective

The objective of the conference is to create a platform for domestic and international researchers to present and discuss recent and significant developments in Complex Hyperbolicity, Function Fields, and Non-archimedean Arithmetic.

In honor of Ha Huy Khoai's 80th birthday and Julie Wang & William Cherry's 60th birthdays.

Co-host Institution & Sponsors

- Vietnam Institute for Advanced Study in Mathematics
- Institute of Mathematics, Academia Sinica, Taiwan
- Institute of Mathematics, Vietnam Academy of Science and Technology
- International Centre of Research and Postgraduate Training in Mathematics, Institute of Mathematics, Vietnam Academy of Science and Technology

Time and venue:

- June 16, 2026: Vietnam Institute for Advanced Study in Mathematics, 161 Huynh Thuc Khang Street, Lang Ward, Hanoi
- June 17-19, 2026: Institute of Mathematics, Vietnam Academy of Science and Technology, 18 Hoang Quoc Viet Road, Nghia Do Ward, Hanoi

Contact:

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Scientific Committee

- **Erwan Rousseau** (University of Western Brittany, France)
- **Min Ru** (University of Houston, USA)
- **Paul Vojta,** (University of California, USA)

Organizing Committee

- **Ta Thi Hoai An** (Institute of Mathematics, Vietnam Academy of Science and Technology)
- **Le Minh Ha** (Vietnam Institute for Advanced Study in Mathematics)
- **Tran Van Tan** (Hanoi National University of Education, Vietnam)
- **Amos Turchet** (Roma Tre University, Italy)

PROGRAM

Tuesday, June 16, 2026

Venue: Vietnam Institute for Advanced Study in Mathematics, 161 Huynh Thuc Khang Street, Lang Ward, Hanoi

08:00 – 08:45 **Registration**
The Laurent Schwartz Lecture Hall

Morning Session (Session Chair: Tran Van Tan)

08:45–09:00 **Welcome and opening remarks**

09:00 – 09h50 **Paul Vojta**, University of California, Berkeley, USA
Toward a sharper Dyson lemma

09:50 – 10:20 **Coffee break**

10:20 – 11:10 **Aaron Levin**, Michigan State University, USA
Integral points on surfaces over function fields

11:10 – 12:00 **Zheng Xiao**, University of Colorado, USA
Families of unit equations and exponential diophantine problems

12:00 – 14:00 **Lunch**

Afternoon Session (Session Chair: Min Ru)

14:00 – 14:50 **Felipe Voloch**, University of Canterbury, New Zealand
Unlikely tangencies on elliptic surfaces

15:00 – 15:50 **Yu Yasufuku**, Waseda University, Japan
More GCD inequalities

16:00 – 16:30 **Coffee break**

16:30 – 17:20 **Lea Beneish**, University of North Texas, USA
Towards Artins conjecture on p-adic forms in low degree

Venue: Institute of Mathematics, Vietnam Academy of Science and Technology, 18 Hoang Quoc Viet, Nghia Do, Hanoi

Wednesday, June 17, 2026

Morning Session (Session Chair: Ta Thi Hoai An)

09:00 – 09h50 **Junjiro Noguchi**, University of Tokyo, Japan
Value distribution and distribution of rational points

09:50 – 10:10 **Coffee break**

10:10 – 11:00 **Carlo Gasbarri**, University of Strasbourg, France
In search of a hyperbolic proof of Mordell's conjecture

11:00 – 12:00 **Guoquan Gao**, Beijing University, China
Diophantine geometry related to abelian varieties over function fields

12:00 – 14:00 **Lunch**

Afternoon Session (Session Chair: Amos Turchet)

14:00 – 14:50 **Huynh Dinh Tuan**, Hue University of Education, Vietnam
Jet differentials and applications

15:00 – 15:50 **Nathan Grieve**, National Taiwan University, Taiwan
Complexity thresholds for divisors, explicit effective Diophantine approximation of algebraic points and Schmidt-Schlickewei subspace type inequalities for points of bounded degree

16:00 – 16:30 **Coffee break**

16:30 – 17:20 **Si Duc Quang**, Hanoi National University of Education, Vietnam
Modified defect relation for Gauss maps of minimal surfaces with hypersurfaces of projective varieties in subgeneral position and related problems

18:30 – 20:30 **Banquet**

Thursday, June 18, 2026

Morning Session (Session Chair: Erwan Rousseau)

09:00 – 09h50 **Damien Brotbek**, University of Lorraine, France
Surfaces of general type with extremal cotangent dimension

09:50 – 10:10 **Coffee break**

10:10 – 11:00 **Song-Yan Xie**, Chinese Academy of Sciences, China
Recent developments in two-dimensional Kobayashi hyperbolicity conjectures

11:00 – 12:00 **Yunling Chen**, Chinese Academy of Sciences, China
An asymptotic equality of Cartan's second main theorem

12:00 – 14:00 **Lunch**

Afternoon: Free time

Friday, June 19, 2026

Morning Session (Session Chair: Julie Wang)

09:00 – 09h50 **Pietro Corvaja**, University of Udine, Italy
Integral points on cubic and quartic surfaces

09:50 – 10:10 **Coffee break**

10:10 – 11:00 **Laura Capuano**, Roma Tre University, Italy
Degeneracy threshold in families of abelian varieties and unlikely intersections

11:00 – 12:00 **Jackson Morrow**, University of North Texas, USA
A non-Archimedean Ax–Lindemann theorem for certain p-adically uniformized Shimura varieties

12:00 – 14:00 **Lunch**

ABSTRACTS

Toward a sharper Dyson lemma

Paul Vojta (University of California, Berkeley, USA)

Abstract: In 1984, H. Esnault and E. Viehweg proved a multivariable version of Dyson's lemma (which can replace Roth's lemma in the proof of Roth's theorem). In a series of papers (1995–1999), Michael Nakamaye refined and simplified the proof of Esnault and Viehweg, and in 1999 claimed a stronger inequality. Unfortunately, his 1999 paper has a gap, which I will discuss and show some partial results toward proving the sharper inequality.

Integral points on surfaces over function fields

Aaron Levin (Michigan State University, USA)

Abstract: Over function fields, we give new results for integral points on surfaces. The results are obtained by combining a method of Corvaja and Zannier with recent advances in Diophantine approximation. This is joint work with Zheng Xiao and Keping Huang.

Families of unit equations and exponential diophantine problems

Zheng Xiao (University of Colorado, USA)

Abstract: This talk explores the distribution of integral points on projective varieties using the Ru-Vojta theorem and a higher-dimensional generalization of the Huang-Levin-Xiao inequalities. Operating under distinct geometric conditions, specifically the transverse and proper intersections of boundary divisors, we apply this dual framework to establish new Diophantine degeneracy results. Key applications presented will include the solution sets of one-parameter families of unit

equations, extended greatest common divisor (GCD) estimates for exponential Diophantine equations, and the representation of perfect powers with few nonzero digits. Ultimately, this presentation highlights how these methods successfully generalize previous surface-level results to higher dimensions.

Unlikely tangencies on elliptic surfaces

Felipe Voloch (University of Canterbury, New Zealand)

Abstract: We study tangencies within an elliptic surface between a fixed curve and the family of torsion curves and with related foliations. Joint work with D. Ulmer.

More GCD inequalities

Yu Yasufuku (Waseda University, Japan)

Abstract: Building on the joint work with Julie Wang, we prove some new GCD inequalities involving the outside-S contributions, similar in shape to the one obtained by Joseph Silverman assuming a deep conjecture of Paul Vojta. The primary ingredient is the Diophantine approximation of Ru–Vojta, together with some algebro-geometric computations. If time permits, we apply our results to some Diophantine equations.

Towards Artins conjecture on p-adic forms in low degree

Lea Beneish (University of North Texas, USA)

Abstract: Let F be a homogeneous polynomial of degree n in at least d^2+1 variables over the p-adic numbers, Q_p. Artin conjectured that such F always have nontrivial zeros in any p-adic field. Although this has been shown to be false in general, the conjecture is still widely believed to be true for prime degree forms. This conjecture holds for $d = 2$ and $d = 3$ due to Hasse and Lewis, respectively. By the work of Ax and Kochen, the conjecture is also known to hold whenever the characteristic of the residue field is sufficiently large. In this talk, we will explore recent progress for low degree forms towards making bounds on the size of the residue field effective. A wide range of techniques are needed, including Bertini theorems, point counting on curves over finite fields, and computation. This is joint work with Christopher Keyes.

Value distribution and distribution of rational points

Junjiro Noguchi (University of Tokyo, Japan)

Abstract: I will begin with discussing how semi-abelian varieties were introduced to the value distribution theory, recalling the well-known results by Picard-Borel-Nevanlinna and Bloch-Ochiai. On the other hand S. Lang proposed an analogue of Mordell's Conjecture over function fields in 1960, which was soon later solved by Y. Manin 1963 and H. Grauert 1965 by different methods. Around 1970 S. Kobayashi introduced the notion of (Kobayashi) hyperbolicity, and then Lang formulated a number of interesting problems on rational points in terms of Kobayashi hyperbolicity in higher dimensional algebraic varieties. This line culminated at Vojta's Conjecture around 1985. In this talk, I will discuss an application of the Big Picard Theorem (N. 1981) for holomorphic maps into semi-abelian varieties to Raynaud's Theorem (Manin-Mumford Conjecture) with the aid of o-minimal theory. The problem is related to Green-Griffiths-Lang Conjecture for entire curves, which was obtained for algebraic varieties with irregularity $q \geq \dim = \kappa$ (Kodaira dimension).

In search of a hyperbolic proof of Mordell's conjecture

Gasbarri Carlo (University of Strasbourg, France)

Abstract: We expect finitely many rational points on hyperbolic varieties and we know that it is the case for hyperbolic curves (Faltings' Theorem). Nevertheless, when one looks to the available proofs of this fact, there is no use of hyperbolicity (perhaps the only exceptions are the approaches by Noguchi and Moriwaki to varieties with ample cotangent bundles over function fields). Unfortunately, at the moment I am not able to give a new proof of Mordell, but I will describe my ideas on how to relate hyperbolicity to the study of rational points.

Diophantine Geometry related to abelian varieties over function fields

Guoquan Gao (Beijing University, China)

Abstract: Diophantine geometry studies rational points (or integral points) on algebraic varieties. There are many major conjectures in this area, such as BombieriLang, Vojta's conjecture, GCD problems, etc. In this talk, I will introduce a new approach in Diophantine geometry over complex function fields, recently developed by Junyi Xie and Xinyi Yuan. This method attempts to realize Vojta's dictionary, connecting Diophantine geometry with Nevanlinna theory. Then I will introduce concrete realizations of this method in cases related to abelian varieties, including: the geometric BombieriLang conjecture for ramified covers of abelian varieties (as well as its generalization to Campana orbifolds), the GCD problem for abelian varieties, and an abc-type inequality. The contributors to these works include Junyi Xie, Xinyi Yuan, Ariyan Javanpeykar, Erwan Rousseau and myself.

Jet differentials and applications

Huynh Dinh Tuan (Hue University of Education, Vietnam)

Abstract: Jet differentials to establish a Gauss curvature estimate for an open Riemann surface M, equipped with a conformal metric induced from a nonconstant holomorphic map that is highly ramified over a generic hypersurface of sufficiently high degree. This talk is based on a recent joint work with Yunling Chen.

Complexity thresholds for divisors, explicit effective Diophantine approximation of algebraic points and Schmidt-Schlickewei subspace type inequalities for points of bounded degree

Nathan Grieve (National Taiwan University, Taiwan)

Abstract: I will report on a subset of recent results. The techniques build on those of Vojta, Schmidt, Bombieri, E. and Gubler, McKinnon, McKinnon-Roth, Ru-Vojta, Ru-Wong, Levin and others.

Modified defect relation for Gauss maps of minimal surfaces with hypersurfaces of projective varieties in subgeneral position and related problems

Si Duc Quang (Hanoi National University of Education, Vietnam)

Abstract: The purpose of this talk is twofold. Firstly, we present the modified defect relations for Gauss maps of minimal surfaces with hypersurfaces of projective varieties in the subgeneral position. Secondly, we talk about some related problems of the modified defect relation for Gauss maps, such as the Gauss curvature estimate and the unicity of Gauss maps sharing hypersurfaces.

Surfaces of general type with extremal cotangent dimension

Damien Brotbek (University of Lorraine, France)

Abstract: An important result of McQuillan implies that surfaces with big cotangent bundle dont contain any Zariski dense entire curve. It follows from the Riemann-Roch Theorem that surfaces for which the Chern numbers satisfy $c_1^2 > c_2$ have big cotangent bundle. But in general, a surface can have big cotangent bundle without satisfying the above inequality of Chern numbers, which raises the question of studying the geography of surfaces with big cotangent bundle, namely to study which Chern numbers can be realized by surfaces with big cotangent bundle, and in particular to look for the lowest possible bound on the slope c_1^2/c_2. Many such examples have been constructed over the years. In this talk, we will explain the situation of Horikawa surfaces, which are the surfaces of lowest possible slope among minimal surfaces of general type, and we will prove that on the one hand, generic Horikawa surfaces admit no symmetric differential forms, but that on the other hand, there exists examples of Horikawa surfaces with big cotangent bundle. This is a joint work with Bruno DeOliveira and Erwan Rousseau.

Recent developments in two-dimensional Kobayashi hyperbolicity conjectures

Songyan Xie (Chinese Academy of Sciences, China)

Abstract: This talk is primarily based on joint work with Lei Hou, Dinh Tuan Huynh, and Jol Merker. We establish new degree bounds for Kobayashi hyperbolicity in dimension two. Our main results are as follows:

- A *very generic* surface in P^3 of degree at least 17 is Kobayashi hyperbolic.
- The complement of a *generic* curve in P^2 of degree at least 12 is Kobayashi hyperbolic.

These bounds improve upon longstanding records in the field, lowering the threshold from 18 to 17 for surfaces (Pun) and from 14 to 12 for complements (Rousseau).

Central to the proofs are new vanishing results for certain negatively twisted invariant 2-jet differentials, obtained through a novel combination of algebraic reduction and computer algebra.

An asymptotic equality of Cartan's second main theorem

Yunling Chen (Chinese Academy of Sciences, China)

Abstract: As a far-reaching generalization of both the Fundamental Theorem of Algebra and the RiemannHurwitz formula, Nevanlinna's Second Main Theorem (SMT) estimates the growth of meromorphic functions by analyzing their zero and pole distributions. However, unlike the classical results–which are exact equalities– the SMT inherently takes the form of inequalities. It naturally raises a question: Can the SMT be refined into an equality? Early discussions can be traced back to Wittich and Teichmller in the 1960s. Progress remained slow until 2013, when K. Yamanoi established an asymptotic equality for meromorphic functions. Shortly afterward, A. Eremenko employed potential theory to discuss the possibility of an extension for higher-dimensional SMT. In this talk, we resolve this problem–known as "the Reversion of Cartan's SMT", posed on A. Eremenko's personal webpage. Building on M. Ru's general formulation of Cartan's SMT, we extend Yamanoi's result to higher dimensions and derive an asymptotic equality for Cartan's SMT applicable to holomorphic maps from C^m to $P^n(C)$ with respect to a family of hyperplanes.

Integral points on cubic and quartic surfaces

Pietro Corvaja (University of Udine, Italy)

Abstract: We show that several problems of different origin can be rephrased in terms of distribution of rational or integral points on surfaces of low degree. Some of these problems can be solved, others constitute open cases of the celebrated Vojta's conjecture.

Degeneracy threshold in families of abelian varieties and unlikely intersections

Laura Capuano (Roma Tre University, Italy)

Abstract: The Zilber-Pink conjectures predict far-reaching constraints on unlikely intersections across several arithmeticgeometric settings, extending classical results such as Manin-Mumford and Mordell-Lang. In this talk, I will present joint work in progress with F. Barroero, T. Ge and F. Tropeano on unlikely intersections in the relative setting of abelian schemes, with the aim of generalizing previous results for curves due to Masser-Zannier and Barroero-Capuano. To do this, we investigate unlikely intersections in relation to a parameter known as the "degeneracy threshold", introduced by Ge to study boundedness of heights in this context. By extending ideas of Habegger-Pila from the constant case to the relative framework, this approach yields new partial results toward Pinks conjecture for higher-dimensional subvarieties.

A non-Archimedean Ax–Lindemann theorem for certain p-adically uniformized Shimura varieties

Jackson Morrow (University of North Texas, USA)

Abstract: The Ax–Lindemann conjecture is a functional transcendence statement in arithmetic geometry concerning the uniformization map of an arithmetic variety. Klingler–Ullmo–Yafaev proved this conjecture for the complex analytification of a Shimura variety. I will present a non-Archimedean analogue of this result for certain p-adically uniformized Shimura varieties, in particular quaternonic Shimura varieties and a class of PEL-type unitary Shimura varieties treated by Rapoport–Zink. Our proof has two main ingredients. First, we prove that the complex and p-adic uniformization maps for these Shimura varieties satisfy the same system of differential equations–this result is an extension of a theorem of Andr from the setting of Shimura curves to our broader setting. Second, we use techniques from differential algebra and results in model theory concerning the theory of differential closed fields to show that the validity of complex analytic Ax–Lindemann statement is equivalent to the validity of p-adic analytic Ax–Lindemann statement in our setting. This is joint work with Marc-Hubert Nicole and Giovanni Rosso.

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