Speaker

	Name	Institution	Title	Abstract
1	Chuangxun Cheng	Nanjing University	Bad reductions of Shimura curves	In this talk, I will explain the structure of reductions of Shimura curves with Gamma_0 level structure and construct two exact sequences of Galois modules. Then I will explain some applications of these two sequences related to the level part of Serre's modularity conjecture and the multiplicity part of the Buzzard-Diamond-Jarvis conjecture.
2	Pietro Corvaja	Università degli Studi di Udine	On the Betti map for sections of abelian schemes	Given an abelian scheme with a section, expressing its abelian logarithm in terms of periods gives rise to the so-called Betti map, a real analytic map on the universal cover of the base. The investigation of the Betti map is linked with classical issues like Manin's theorem of the kernel and 'Poncelet games'. In a recent work with Y. André and U. Zannier (partially with Z. Gao) we investigated the rank of the Betti map and its relations with the Kodaira-Spencer map.
3	Ziyang Gao	Princeton University	Application of mixed Ax-Schanuel to bounding the number of rational points on curves	With Philipp Habegger we recently proved a height inequality, using which one can bound the number of rational points on 1-parameter families of curves in terms of the genus, the degree of the number field and the Mordell-Weil rank (but no dependence on the Faltings height). In this talk I will give a blueprint to generalize this method to arbitrary curves. In particular I will focus on: (1) how establishing a criterion for the Betti map to be immersive leads to the desired bound; (2) how to apply mixed Ax-Schanuel to establish such a criterion. This is work in progress, partly joint with Vesselin Dimitrov and Philipp Habegger.
4	Philipp Habegger	Universität Basel	No Singular Modulus is a Unit	A singular modulus is the j-invariant of an elliptic curve with complex multiplication. It is a classical fact that singular moduli are algebraic numbers and even algebraic integers. Bilu, Masser, and Zannier asked whether there exists a singular modulus that is an algebraic unit. In earlier work I was able to show that at most finitely many singular moduli are units. But this proof was ineffective due to trouble coming from a possible Siegel zero. In joint work with Bilu and Kühne, we give a new proof and show that no singular modulus is a unit.
5	Yongquan Hu	MCM	Mod p cohomology of Shimura curves	At present, the mod p (and p-adic) local Langlands correspondence is only well understood for the group $\mathrm{GL}_2(\mathbb{Q}_p)$, but remains mysterious even for GL_2 of an unramified extension of $\mathbb{Q}_p$. However, the Buzzard-Diamond-Jarvis conjecture and the mod p local-global compatibility for $\mathrm{GL}_2/\mathbb{Q}$ suggest that this hypothetical correspondence may be realized in the cohomology of Shimura curves with characteristic p coefficients (cut out by some modular residual global representation). In the talk, I will report some results on the mod p cohomology of Shimura curves from the point of view of the mod p Langlands program. This is a joint work (in progress) with Haoran Wang.

6	Annette Huber-Klawitter	Albert-Ludwigs-Universität Freiburg	A generalisation of Baker's theorem	We report on joint work with Gisbert Wuestholz. Logarithms of algebraic numbers are known to be transcendental. Baker gave a description of the dimension of the $\bar{\mathbf{Q}}$-vector space spanned by the logarithms of the algebraic numbers $\alpha_1,\dots,\alpha_n$: it is the rank of the abelian group generated by the α_i in $\mathbf{C}$. We generalise this to arbitrary 1-dimensional periods, i.e., complex numbers obtained by integrating algebraic 1-forms on an algebraic curve defined over $\bar{\mathbf{Q}}$ over paths with endpoints in algebraic points. The proof relies on a reinterpretation of the periods as periods of Deligne 1-motives and a generalisation of Wuestholz's analytic subgroup theory to 1-motives.
7	Peter Jossen	ETH Zürich	Exponential Periods and Exponential Motives	I begin by explaining Nori's formalism and how to use it to construct abelian categories of motives. Then, following ideas of Katz and Kontsevich, I show how to construct a tannakian category of "exponential motives" by applying Nori's formalism to rapid decay cohomology, which one thinks of as the Betti realisation. This category of exponential motives contains the classical mixed motives à la Nori. We then introduce the de Rham realisation, as well as a comparison isomorphism with the Betti realisation. When k = IQ, this comparison isomorphism yields a class of complex numbers, "exponential periods", which includes special values of the gamma and the Bessel functions, the Euler--Mascheroni constant, and other interesting numbers which are not expected to be periods of classical motives. In particular, we attach to exponential motives a Galois group which conjecturally governs all algebraic relations among their periods.
8	Rafael von Kanel	Tsinghua University	On the representability of moduli problems on Hilbert moduli stacks	It is often fundamental for the study of a moduli space to know whether the underlying moduli problem is representable. In the first part of this talk we discuss explicit representability criteria for moduli problems on the Hilbert moduli stacks of Rapoport and Deligne-Pappas. Our criteria also apply over the bad primes and they are optimal in many situations of interest. In the second part, we consider applications of our criteria to the study of integral points on Hilbert modular varieties and we explain how the work of Masser-Wustholz is used in the proofs. This is joint work with Arno Kret.
9	Daniel Kriz	Massachusetts Institute of Technology	A new p-adic Maass-Shimura operator and supersingular Rankin-Selberg p-adic L-functions	We introduce a new p-adic Maass–Shimura operator acting on a space of "generalized p-adic modular forms" (extending Katz's notion of p-adic modular forms), defined on the p-adic (preperfectoid) universal cover of a Shimura curve. Using this operator, we construct new p-adic L-functions in the style of Katz, Bertolini–Darmon–Prasanna and Liu–Zhang–Zhang for Rankin–Selberg families over imaginary quadratic fields K, in the "supersingular" case where p is inert or ramified in K. We also establish new p-adic Waldspurger formulas, relating p-adic logarithms of elliptic units and Heegner points to special values of these p-adic L-

				functions. If time permits, we will discuss some applications to the arithmetic of abelian varieties.
10	Yifeng Liu	Northwestern University	Mixed arithmetic theta lifting	In this talk, we will extend the construction of arithmetic generating functions and arithmetic theta liftings to unitary groups of odd ranks (on the source). We also formulate the conjectural arithmetic inner product formula (for central L-derivative) for unitary groups of odd ranks.
11	Ngaimin Mok	Hong Kong University	Universal Covering Maps from Bounded Symmetric Domains to Their Finite-Volume Quotients	By the Uniformization Theorem a compact Riemann surface other than the Riemann Sphere or an elliptic curve is uniformized by the unit disk and equivalently by the upper half plane. The upper half plane is also the universal covering space of the moduli space of elliptic curves equipped with a suitable level structure. In higher dimensions the Siegel upper half plane (which is biholomorphic to a bounded symmetric domain) is an analogue of the upper half plane, and it is the universal covering space of moduli spaces of polarized Abelian varieties with appropriate level structures. In general, finite-volume quotients of bounded symmetric domains, which are naturally quasi-projective varieties, are of immense interest to Several Complex Variables, Algebraic Geometry and Number Theory, and an important object of study is the universal covering map $\pi_\Gamma: \Omega \to X_\Gamma$ from a bounded symmetric domain Ω onto its quotient $X_\Gamma := \Omega/\Gamma$ by a torsion-free discrete lattice $\Gamma \subset {\rm Aut}(\Omega)$. We will explain an approach from the perspectives of Complex Differential Geometry and Several Complex Variables to the study of the universal covering map revolving around the notion of asymptotic curvature behavior, rescaling arguments and the use of meromorphic foliations, and illustrate how this approach using transcendental techniques leads to solutions of various problems from Functional Transcendence Theory concerning totally geodesic subvarieties of finite-volume quotients without the assumption of arithmeticity.
12	Xu Shen	MCM	p-adic periods and the Fargues-Rapoport conjecture	In his 1970 ICM report, Grothendieck asked the question to describe the p-adic analogues of Griffiths period domains. In this talk, we will review some constructions for these p-adic period domains, following recent developments in p-adic Hodge theory. We will then explain some ideas in a proof of the Fargues-Rapoport conjecture about the structure of certain p-adic period domains. This is joint work with Miaofen Chen and Laurent Fargues.
13	Ye Tian	MCM	Perrin-Riou conjecture and p-adic periods	We give a proof of Perrin-Riou conjecture, which relates p-adic logarithm of Beilinson-Kato elements to L-functions, and we will also discuss its application to BSD formula. This is joint work with Burungale and Skinner.
14	Gisbert Wüstholz	ETH Zurich	Geodesic Billiards	
15	Jing Yu	National Taiwan University	A Garden in Positive Characteristic	I will give survey talk on progress of characteristic p>0 transcendence theory, in particular in the direction of algebraic independence. The impact of the seminal paper by Wuestholz in 1980's opens a door for us, so that this part of

				arithmetic geometry of positive characteristic can go far further than the classical theory. I will focus on: Drinfeld modules, Multiple zeta values, and Gamma values.
16	Xinyi Yuan	UC Berkeley	Weak Lefschetz theorems for Brauer groups	In this talk, we introduce some Lefschetz-type theorems for Brauer groups of hyperplane sections of smooth projective varieties. This is more or less known when the dimension of the hyperplane section is at least 3, but we will also introduce a version which lowers the dimension from 3 to 2. As a consequence, we reduce the Tate conjecture for divisors on smooth projective varieties from general dimensions to dimension 2, and thus proves a results of Morrow by a different method.