WORKSHOP PROGRAMME

Potential geometric aspects on arithmetic and complex dynamics

September 9–11, 2026

September 9 — Wednesday

13:00–14:00	**Jit Wu Yap**
14:15–15:15	**Yutaro Sugimoto**
15:30–16:30	**Reimi Irokawa**

September 10 — Thursday

10:00–11:00	**Haruki Imamura**
11:15–12:15	**Hayato Matsumoto**
14:00–15:00	**Jit Wu Yap**
15:15–16:15	**Rin Gotou**
16:30–17:30	**Yu Yasufuku**

September 11 — Friday

10:00–11:00	**Yohsuke Matsuzawa**
11:15–12:15	**Jit Wu Yap**
14:00–15:00	**Yûsuke Okuyama**
15:15–16:15	**Kaoru Sano**

Abstracts

Canonical Heights and Preperiodic Points on Subvarieties

Jit Wu Yap

Let f be an endomorphism of $\mathbb{P}^n$ with degree at least 2. In this series of lectures, we will explore how the arithmetic theory of heights can be used to study the geometry and distribution of preperiodic points of f lying on subvarieties of $\mathbb{P}^n$. We will begin with the basic theory of heights and canonical heights of points, and then extend these notions to subvarieties. We will next introduce tools from Arakelov theory for studying subvarieties of canonical height zero, and illustrate their applications through the Dynamical Manin–Mumford conjecture on $(\mathbb{P}^1)^2$. We will conclude with recent developments on uniformity questions in arithmetic dynamics, an area that has seen rapid progress in recent years.

Dynamical degrees on rational varieties and irrational Fano varieties

Yutaro Sugimoto

Dynamical degrees are birational invariants defined for birational maps of projective varieties. When the dimension of the variety is three or higher, the possible values of dynamical degrees are not well understood. For projective spaces of dimension at least three, Bell, Diller, Jonsson and Krieger showed that the dynamical degrees can be transcendental. In this talk, by applying their result, we will show that the intermediate dynamical degrees can be simultaneously transcendental for rational varieties. In the rest of the talk, we will see the construction of a birational map of an irrational Fano threefold with dynamical degree greater than one.

Non-Archimedean and Hybrid Dynamics of Regular Polynomial Automorphisms

Reimi Irokawa

This talk is based on work in progress by the speaker. We study degenerating families of regular polynomial automorphisms of affine spaces of arbitrary dimension, using the theory of hybrid spaces developed by Boucksom, Favre, and Jonsson. Given an analytic family of regular polynomial automorphisms $\{f_t : \mathbb{C}^n \to \mathbb{C}^n\}_{t\in\mathbb{D}^*}$ which may degenerate meromorphically at the origin, we consider the associated family of invariant measures μ_t on $\mathbb{C}^n$. The family f_t induces a polynomial automorphism $f^{\mathrm{an}}_{\mathbb{C}((t))} : \mathbb{A}^{n,\mathrm{an}}_{\mathbb{C}((t))} \longrightarrow \mathbb{A}^{n,\mathrm{an}}_{\mathbb{C}((t))}$, which carries an invariant measure μ_0. Our main theorem states that μ_t converges weakly to μ_0 as $t \to 0$ over the associated so-called hybrid space. The speaker has previously proved this result in the case $n = 2$, i.e. for Hénon maps, and the present work extends it to higher-dimensional dynamical systems.

The canonical height gap for polynomial maps and portraits of preperiodic points of polynomials with height 0

Haruki Imamura

The difference between the canonical height and the Weil height plays an important role in arithmetic dynamics. Although explicit upper bounds for this height gap generally depend on the degree d, we establish a bound independent of d for polynomial maps. As an application, we determine the set of rational preperiodic points for polynomial maps of height 0 with coefficients in $\mathbb{Q}$, and classify their realizable portraits.

Some Explicit Examples of the Dynamical Mahler Measure

Hayato Matsumoto

The Mahler measure, which can be viewed as a generalization of the naive height, has been extensively studied since the classical works of Mahler and Lehmer. Subsequently, the dynamical Mahler measure has been formulated through approaches in Arakelov geometry and the theory of Call-Silverman heights associated to iterations of maps. On the other hand, because the dynamical Mahler measure is defined via an integral with respect to an invariant measure on the Julia set, it poses significant challenges not only in explicit computation but also in its theoretical treatment. In this talk, we will introduce the dynamical Mahler measure, review the main known results to date, and present new explicit examples recently computed by the speaker.

Chow Quotient Moduli Spaces, Berkovich Trees, and Rescaling Limits

Rin Gotou

Let $d \geq 2$ be an integer, and let Rat_d denote the parameter space of degree-d rational self-maps of $\mathbb{P}^1$. It is a Zariski-open subvariety of the projective space $\overline{Rat}_d \simeq \mathbb{P}^{2d+1}$. The moduli space rat_d of degree-d dynamical systems on $\mathbb{P}^1$ is the quotient of Rat_d by the conjugation action of $G = \mathrm{Aut}(\mathbb{P}^1) \simeq \mathrm{PGL}_2$.
For a degenerating one-parameter family (φ_t) in Rat_d, different parameter-dependent changes of coordinates γ_t may produce different rescaling limits

$$\lim_{t \to 0} \left(\gamma_t^{-1} \circ \varphi_t \circ \gamma_t\right)$$

in $\overline{Rat}_d$. A compactification intended to describe such degenerations should therefore retain a collection of limiting G-orbits rather than only a single limit.
We study the Chow quotient $Y_d := \overline{Rat}_d //_{Ch} G$, whose boundary points are represented by effective cycles of orbit closures. We introduce Hu's perturbation-translation-specialization (PTS) principle for Chow quotients from a Berkovich perspective: after passing to a valued field, a parameter-dependent change of coordinates determines a type II point ξ, and specialization is described by reduction at ξ. This viewpoint explains how the irreducible components of a boundary cycle arise. We also introduce a marked Chow quotient that organizes collections of rescaling limits using decorated trees whose vertices correspond to type II points and the associated reductions of the family. This provides a moduli-theoretic description of rescaling limits in terms of dynamical systems on trees of spheres.
If time permits, we will also introduce an orbit-degree generating function and discuss its expected relation to the canonical measure associated with the dynamical system.

Numerical properties of values of canonical heights

Yu Yasufuku

Since the work of Call and Silverman, canonical heights for dynamical systems have been studied extensively. In this talk, we attempt to study some numerical properties of values of canonical heights.

Height growth along backward orbits of rational maps on projective varieties

Yohsuke Matsuzawa

Let f be a dominant rational self-map on a projective variety X defined over $\overline{\mathbb{Q}}$. Let us consider the height growth along backward orbit $(x_n)_n$ of f as backward analogue of arithmetic degree. I proved that the height growth rate $\max\{1, h(x_n)\}^{1/n}$ converges for generic backward orbits, and is bounded above by $\max\{1, d_{\dim X-1}(f)/d_{\dim X}(f)\}$. I will introduce several basic questions on this topic. The material of this talk is work in progress.

On a theorem of Buff–Gauthier

Yûsuke Okuyama

Buff and Gauthier generalized Bassanelli–Berteloot's equidistribution of rational functions having a given multipler to the setting of possibly moving multipliers for quadratic family. In this talk, we give a new proof of this theorem in complex dynamics, and also a refinement of it in the setting of arithmetic dynamics.

Arithmetic of parabolic periodic points and parabolic parameters

Kaoru Sano

One dynamical analogue of CM elliptic curves is provided by postcritically finite (PCF) parameters. Recently, we observed that by focusing on a different characteristic property of CM elliptic curves, parabolic parameters can also be viewed as a natural dynamical analogue of CM elliptic curves. CM elliptic curves lie at the heart of a rich theory related to class field theory, including Kronecker's Jugendtraum. In this talk, I will propose dynamical analogues of certain aspects of this theory and present proofs of some of the resulting statements.