

Special day on flat bundles and loop operations on surfaces

March 17(Tue), 2026.

Room 123, Graduate School of Mathematical Sciences,
University of Tokyo (Komaba).

10:00–11:00: **Arpan Kabiraj** (Palakkad)

Characterizing curves via Goldman Lie Bracket

Abstract: In 80's, Goldman introduced a Lie bracket on the linear span of the free homotopy classes of directed closed curves on a surface called the Goldman Lie bracket. In this talk, we will discuss the definition and basic properties of the Goldman Lie bracket. We will also discuss the use of hyperbolic geometry to characterize closed curves using the Goldman Lie bracket. This is a joint work with Moira Chas.

11:30–12:30: **Aoi Wakuda** (U. Tokyo)

Separability criteria for loops via the Goldman bracket

Abstract: In this talk, we give algebraic criteria, via the Goldman bracket, for when two (not necessarily simple) free homotopy classes of loops on an oriented surface have disjoint representatives. As an application, we determine the center of the Goldman Lie algebra of a pair of pants. We extend Kabiraj's method, which was originally limited to oriented surfaces filled by simple closed geodesics, and show that in this case, the center is generated by the class of loops homotopic to a point, and the classes of loops winding multiple times around a single puncture or boundary component.

14:00–15:00: **Florent Schaffhauser** (Heidelberg)

Hodge bundles with Galois symmetry

Abstract: Carlos Simpson used the scaling action on Higgs fields to show that moduli space of semistable Higgs bundles of fixed rank and degree are connected. There are several contexts in which one might want to study a similar question for Higgs bundles with some kind of additional symmetry. In joint work with Tommaso Scognamiglio, we look at the case of Higgs bundles over a real algebraic curve and explain how to extend Simpson's method in this context, at least when the rank and degree are coprime. We will see in particular, the role played by the modular interpretation of Galois fixed points in order to be able to count the number of connected components of this space as a subset of the moduli space of Higgs bundles.

15:30–16:30: **Mengxue Yang** (Kavli IPMU, U. Tokyo)

A Stacky Cayley correspondence

Abstract: We reinterpret the generalized Cayley correspondence of Bradlow–Collier–Garcia-Prada–Gothen–Oliveira as a morphism of Lagrangians over the Hitchin moduli stack. The construction of the Lagrangians turns out to be a special case of Gaiotto's Lagrangians in the context of boundary conditions of some physical theories, which are also related to the recent program of relative Langlands of Ben-Zvi–Sakellaridis–Venkatesh. We apply these abstract machineries to two families of Lagrangians associated to a magical sl_2 -triple, and generalize some theorems about the general Cayley correspondence to the level of stacks. This is joint work with Eric Chen and Enya Hsiao.

Organizer: **Nariya Kawazumi** (U. Tokyo) kawazumi@ms.u-tokyo.ac.jp