2026 BLOOMINGTON GEOMETRY WORKSHOP

Amie Wilkinson
Title: Dynamical symmetry
Abstract: The centralizer $Z(f)$ of a diffeomorphism $f\colon M \to M$ of a closed manifold M is the group of all diffeomorphisms commuting with f; it is the collection of dynamical symmetries of f. The centralizer of f always contains the group $\langle f \rangle$ generated by f as a normal subgroup, and conjecturally the two typically coincide (that is, "the generic diffeomorphism has only trivial symmetries"). In this talk, I will describe some results and conjectures in a project with Danijela Damjanovic, Chengyang Wu and Disheng Xu that addresses the question: what happens when $Z(f)$ is bigger than $\langle f \rangle$?

Dan Margalit
Title: Braid groups, elliptic fibrations, and K3 surfaces
Abstract: The level m congruence subgroups of the braid group form a rich sequence of groups, with equally rich spaces associated to them. We will give an introduction to these groups, with special focus on the level 4 case. After surveying some known results, we will discuss recent work with Kevin Kordek that gives a bridge between the level 4 braid group, elliptic fibrations, and the topology of K3 surfaces.

Wendy Wang
Title: Dynamical Properties of Compositions of Symplectic Dehn Twists
Abstract: On a two-dimensional surface of genus at least one, one can consider isotopy classes of self-homeomorphisms, which form the mapping class group of the surface. The classical Nielsen–Thurston classification divides elements of the mapping class group into three types: periodic, reducible, and pseudo-Anosov. Among these, pseudo-Anosov maps exhibit rich dynamical properties, including a pair of stable and unstable foliations, as well as exponential growth in periodic orbits and intersection numbers.
In this talk, we give an analogous classification of symplectic mapping classes in higher-dimensional A_n-manifolds and construct a class of symplectic maps with certain hyperbolic properties via compositions of symplectic Dehn twists. We prove that these maps have positive topological entropy, admit invariant family of Lagrangian submanifolds, and exhibit exponential growth in their Floer homology. This represents joint work with Wenmin Gong and Jinxin Xue.

Aleksander Skenderi
Title: Asymptotically large free semigroups in Zariski dense discrete subgroups of Lie groups
Abstract: An important quantity in the study of discrete groups of isometries of Riemannian manifolds, Gromov hyperbolic spaces, and other interesting geometric objects is the critical exponent. For a discrete subgroup of isometries of the quaternionic hyperbolic space or octonionic projective plane, Kevin Corlette established in 1990 that the critical exponent detects whether a discrete subgroup is a lattice or has infinite covolume. Precisely, either the critical exponent equals the volume entropy, in which case the discrete subgroup is a lattice, or the critical exponent is

less than the volume entropy by some definite amount, in which case the discrete subgroup has infinite covolume. In 2003, Leuzinger extended this gap theorem for the critical exponent to any discrete subgroup of a Lie group having Kazhdan's property (T) (for instance, a discrete subgroup of $\mathrm{SL}(n, \mathbb{R})$, where n is at least 3). In this talk, I will present a result which shows that no such gap phenomenon holds for discrete semigroups of Lie groups. More precisely, for any Zariski dense discrete subgroup of a Lie group, there exist free, finitely generated, Zariski dense subsemigroups whose critical exponents are arbitrarily close to that of the ambient discrete subgroup. As an application, we show that the critical exponent is lower semicontinuous in the Chabauty topology whenever the Chabauty limit of a sequence of Zariski dense discrete subgroups is itself a Zariski dense discrete subgroup.

Prasuna Bandi
Title: Ergodic averages over compact submanifolds and application to diophantine approximation
Abstract: We prove a pointwise ergodic theorem for averages over dilates of a compact submanifold for a measure-preserving $\mathbb{R}^d$-action, under the assumption of exponential mixing. We also obtain error rates, giving explicit bounds on the speed of convergence. This has an application in multiplicative diophantine approximation providing a partial analogue of Khintchine's zero-one law. This is a joint work with Reynold Fregoli and Dmitry Kleinbock.

Grigori Avramidi
Title: Free ideals and cellular waist inequalities in hyperbolic geometry
Abstract: I will discuss a result showing for a closed hyperbolic manifold M and a (sufficiently nice) map $f\colon M \to \mathbb{R}^m$, that there is a fiber whose topological complexity (measured by the number of cells in a cell structure) is bounded below in terms of the injectivity radius of M. It is based on freeness of ideals in group rings of hyperbolic groups, and partially addresses a recent question of Gromov. Joint work with Thomas Delzant.

Andrey Gogolyev
Title: Rigidity of Anosov flows and geometric applications
Abstract: If a weak form of equivalence implies a much stronger equivalence, one speaks of a rigidity phenomenon. In recent years, jointly with F. Rodriguez Hertz and M. Leguil, we have been exploring the rigidity of Anosov flows—specifically, settings where a continuous conjugacy must necessarily be smooth. I will survey the history of the problem and its connections to geometry, which often arise via geodesic flows on negatively curved manifolds. Many interesting problems remain open.

Amie Wilkinson
Title: Periodic data rigidity in negative curvature
Abstract: A Riemannian metric on a manifold M gives rise to a smooth dynamical system on its unit tangent bundle SM, known as the geodesic flow. The interplay between the geometry of M and the dynamical properties of this flow is rich and interesting. When M is closed and negatively curved, the geodesic flow is hyperbolic (or Anosov). Rigidity phenomena in hyperbolic dynamics are reflected in geometric rigidity in negative curvature, a prime example being marked length spectrum rigidity, which concerns the length of closed geodesics in M-periodic orbits in SM. I will discuss another type of hyperbolic rigidity phenomenon, less explored in this

context, which concerns first order invariants (curvature of horospheres, growth of Jacobi fields on the geometric side, and marked Poincaré spectrum, Lyapunov exponents on the dynamical side).