NATALIA JONARD-PEREZ, Universidad Nacional Autónoma de México

Groups of affine transformations acting on hyperspaces of compact convex subsets of $\mathbb{R}^n$

Let $n \geq 2$. We will denote by $\mathsf{Aff}(n)$ the group of all affine transformations of $\mathbb{R}^n$ while $cc(\mathbb{R}^n)$ will be the hyperspace of all compact convex subsets of $\mathbb{R}^n$ equipped with the Hausdorff distance topology. In this talk we are interested in showing how the topology of certain subspaces of $cc(\mathbb{R}^n)$ is directly related to the geometry of the action of a specific subgroup of $\mathsf{Aff}(n)$. Understanding the dynamic of such action allows us to give a concrete description of the subspace's topology.

On the other hand, by studying the topology of the orbit spaces generated by the action of some subgroups of $\mathsf{Aff}(n)$ on certain subspaces of $cc(\mathbb{R}^n)$ we get some interesting results. In this line, we show that the orbit spaces $cb(\mathbb{R}^n)/\mathsf{Aff}(n)$ and $cc_1(\mathbb{R}^n)/\mathsf{Sim}(n)$ (where $\mathsf{Sim}(n)$ stands for the group of all similarities of $\mathbb{R}^n$) are both homeomorphic to the Banach-Mazur compactum $BM(n)$. Furthermore, if $E(n)$ denotes de Euclidean group, the orbit space $cc(\mathbb{R}^n)/E(n)$ (which corresponds with the Gromov-Hausdorff hyperspace of all compact convex subsets of $\mathbb{R}^n$) is homeomorphic to the open cone over $BM(n)$.

Many of the results presented in this talk were obtained in a joint work with Sergey Antonyan.