

# Problems on Algebraic and Geometric Topology and Applications

## Group leaders:

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**Abstract:** This research project consists of exploring the following themes in Algebraic Topology:

1. Generalized Gysin Sequences and Applications: This project aims to study new versions of the Gysin sequences by using Serre Spectral Sequence with more general coefficients and Thom isomorphism theorem.
2. Parameterized versions of the Borsuk-Ulam Theorem: The aim of this project is to obtain parameterized versions of the Borsuk-Ulam Theorem, for bundles with fiber of the Stiefel manifolds (or complex Stiefel variety), in the sense of Dold.
3. Extension, intersection and transversality maps on manifolds: The objective of this project is to consider the problem of extension of maps on smooth manifolds under certain conditions of intersection and transversality.
4. The Representation of Generalized String Links over the Disk Problem: This project aims to study the Braid Representation Theorem on the Disk for the more general case of homotopic braids (formally called Group of Generalized String Links over the Disk).
5. A Relationship Between Bordism and L-Equivalence: This project investigates the relationship between the bordism group  $\Omega_k(N)$  and the L-equivalence classes  $L_k(N)$ , defined using compact oriented  $(k+1)$ -dimensional submanifolds of  $N \times I$ . The main goal is to analyze the map  $\varphi: L_k(N) \rightarrow \Omega_k(N)$ , determining whether it is injective, surjective, or neither.