Ecole Graduée 631 MADIS
Sujet de thèse en Mathématique proposé en 2026

Titre : Topological and symplectic aspects of curve arrangements

Directeur de thèse : Paolo Aceto
E-mail : paolo.aceto@univ-lille.fr

Co-directeur de thèse : Marco Golla (CNRS – Université de Nantes)
E-mail : marco.Golla@univ-nantes.fr

Laboratoire : Paul Painlevé

Equipe : Géométrie et Topologie

Descriptif : An old and popular topic in classical algebraic geometry is the study of line arrangements in the (complex) projective plane. Typical questions in this context include the existence of realizations of given combinatorial arrangements as well as various uniqueness and classification issues. In the context of smooth and symplectic topology, recent works have shown how some of this questions can be studied in these more flexible categories highliting interesting comparisons between the algebraic and the topological setting.

The purpose of this thesis project is to push forward such investigations by exploring further generalizations allowing for instance the presence of higher genus curves in the arrangements. Early examples show that constraints on the existence of such realizations can be obtained via standard modern 4-dimensional techniques. The candidate will have the possibility to focus both on the smooth as well as the symplectic setting thus developing different techniques so as to diversify the relevant working knowledge.

Références :

- R. Gompf, A. Stipsicz **4-manifolds and Kirby calculus**, Graduate Studies in Mathematics, AMS

- Daniel Ruberman, Laura Starkston, Topological Realizations of Line Arrangements, *International Mathematics Research Notices*, Volume 2019, Issue 8, April 2019, Pages 2295–2331, https://doi.org/10.1093/imrn/rnx190

- Gilmer, Patrick M. "Configurations of Surfaces in 4-Manifolds." *Transactions of the American Mathematical Society*, vol. 264, no. 2, 1981, pp. 353–80