

# **PGMO lecture of Thorsten Theobald**

**jeudi 15 février 2024 - vendredi 16 février 2024**

**Ecole polytechnique, Palaiseau**

## **Programme Scientifique**

The purpose of the course is to provide a comprehensive access to interesting and important techniques in the interplay of real algebraic geometry and optimization. In the modern developments, these methods are essential for the optimization of polynomials and of exponential sums.

The lectures provide the background from real algebraic geometry and conic optimization, offer a comprehensive look behind the scenes of current polynomial optimization techniques and discuss recent developments. The topics and aspects include semialgebraic foundations, positive polynomials through sum of squares and convexity, polynomial optimization, spectrahedra, hyperbolic optimization, symmetry reduction, relative entropy methods and sums of nonnegative circuit polynomials.