# Contributions of Applied Mathematics to Meshing Technologies and their Applications to Aerospace Simulations

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This talk will enlighten the impact of mathematics on adaptive meshing technologies. It is well-known the Delaunay kernel and Voronoi diagram are at the core of tetrahedral mesh generation techniques. For adaptive meshing, mastering a priori error analysis, Riemannian metric spaces, adjoint and variational calculus is required. The duality between discrete meshes and continuous meshes represented by Riemannian metric spaces is fundamental in recent error estimation analysis. It is then possible to extend these mathematical analyses to unsteady problems and problems with moving geometries. This leads to adaptive meshing methods that are fully justified theoretically and do not rely on heuristics. Finally, we will show the application of the adaptive meshing technologies to aerospace simulations for steady problems, unsteady problems and problems with moving geometries.