# Séminaire de mathématiques et leurs applications

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**Titre:** High-Order Hyperbolic Discontinuous Galerkin Schemes for Advection-Diffusion Problems.

**Résumé:** In this talk we discuss development of arbitrary high-order discontinuous Galerkin (DG) schemes designed based on reformulation of the target governing equation as a first-order hyperbolic advection-diffusion system. We present, in details, the efficient construction of the proposed high-order schemes, and show that these schemes have the same number of global degrees-of-freedom as comparable conventional high-order DG schemes, produce the same or higher order of accuracy solutions and solution gradients, are exact for exact polynomial functions, and do not need a second-derivative diffusion operator, which is needed in almost all other available schemes. We also present construction of a Weighted Essentially Non-Oscillatory (WENO) limiter for the proposed schemes. We demonstrate that the constructed high-order schemes give excellent quality solution and solution gradients on irregular triangular elements, and provide some comparisons with conventional DG and interior-penalty schemes.