

# Long time integration of stochastic differential equations: the interplay of geometric integration and stochastic integration

*Friday, 21 June 2019 10:00 (45 minutes)*

The preservation of geometric structures, such as the symplecticity of the flow for deterministic Hamiltonian systems, often reveals essential for an accurate numerical integration, and this is the aim of geometric integration. In this talk we highlight the role that some geometric integration tools, that were originally introduced in the deterministic setting, play in the design of new accurate integrators to sample the invariant distribution of ergodic systems of stochastic ordinary and partial differential equations. In particular, we show how the ideas of modified differential equations, Butcher trees, and processing techniques permit to increase at a negligible overcost the order of accuracy of stiff integrators.

This talk is based on joint works with Assyr Abdulle (EPF Lausanne), Ibrahim Almuslimani (Univ. Geneva), Charles-Edouard Béhier (Univ. Lyon), David Cohen (Univ. Umeå), Adrien Laurent (Univ. Geneva), Gregorios A. Pavliotis (Imperial College London), Konstantinos C. Zygalakis (Univ. Edinburgh).

Preprints available at <http://www.unige.ch/~vilmart>

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