

## AAGAIS 2018

Synopsis and Organizers

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### Asymptotic, Algebraic and Geometric Aspects of Integrable Systems

Integrable systems involves the study of physically relevant nonlinear equations, which includes many families of well-known, highly important partial and ordinary differential equations. Building on seminal work in the past, the theory of discrete integrable systems, dealing with difference counterparts of the afore-mentioned equations, has undergone a truly remarkable development in the past two decades. Although difference equations are often used as (numerical) approximations to differential equations, it is now understood that discrete Integrable systems are in a sense more fundamental than their continuous counter-parts, and hence merit to be studied in their own right. Together with their discovery, new mathematics has come to the fore, generalizing to the realm of discrete space-time many mathematical concepts in geometry and asymptotics that were formerly only defined in the context of smooth manifolds and continuous analysis. Thus, in recent years, various novel mathematical techniques and methods have been developed to study these discrete systems and their solutions, bringing together ideas stemming from several branches of mathematics and physics, that are usually distinct, now come together: asymptotic analysis, algebraic geometry, representation theory, spectral/isomonodromy analysis, random matrix theory, exactly solvable models, theory of special functions and combinatorial geometry.

The main objective of the workshop is to bring together experts from asymptotic analysis, representation theory and geometry, together to create a platform to exchange current results and novel ideas. During the Workshop, we plan to address the following topics: special and global behaviour of solutions of integrable lattices and discrete Painlevé equations, resolution and asymptotic analysis of initial value space, symmetries and geometry of discrete equations.

#### Organizers

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