Friday, October 6th (at 4.00pm, UK time)

Plamen Iliev (Georgia Tech)

Title: Higher-order heat equation and the Gelfand-Dickey hierarchy.

ABSTRACT

The fundamental solution of the heat equation on the real line has been linked to the theory of solitons from early days, by providing a tool for obtaining integrals of the motion for the KdV equation.

In this talk I will explain how one can go in the opposite direction and compute the heat kernel using Sato's theory. This approach can be used to establish different properties of Hadamard's coefficients for higher-order differential operators. In particular, combing these results with the correspondence between commutative rings of differential operators and algebraic curves due to Burchnall-Chaundy and Krichever, one can characterize the finite heat kernel expansions as the rational solutions of the Gelfand-Dickey hierarchy or the rank-one solutions of the bispectral problem vanishing at infinity.