

**Alexei Rybkin**

*On the Hankel operator approach to completely integrable systems.*

Completely integrable systems and the theory of Hankel/Toeplitz operators are very large and active theories that have remained essentially hermetic to each other. In this talk we demonstrate that there are some deep links between the two. On the prototypical example of the Cauchy problem for the Korteweg-de Vries (KdV) equation we demonstrate the power of the language of Hankel operators in which symbols are conveniently represented in terms of the scattering data for the Schrodinger operator associated with the initial data for the KdV equation. This approach recovers and improves on many already known results as well as yields to a variety of new ones. The main new result is the well-posedness of the Cauchy problem for the KdV equation with initial data behaving essentially arbitrary at minus infinity and decay sufficiently fast at plus infinity. The talk is based on joint work with Sergei Grudsky.