

TEMPLE UNIVERSITY MATHEMATICS COLLOQUIUM

Nicholas Ercolani

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will speak on

Bäcklund Transformations: Old and New

ABSTRACT: Bäcklund transformations (also known as Darboux transforms, Crum transforms, dressing transformations, Burchnell-Chaundy transferences,... depending on the setting) classically played a role in many areas of mathematics including differential geometry, Lie theory, spectral theory, dynamical systems theory, nonlinear PDE, algebraic geometry, and mathematical physics.

More recently (latter 20th century) interest in these transforms was revived through their connections to integrable systems theory and, in particular, integrable nonlinear PDE such as the KdV, sine-Gordon and NLS equations. In this talk we will reprise a perspective on these integrable systems connections that was developed by Ercolani-McKean within the context of scattering theory, but which extends to a broader and more elementary perspective on Bäcklund transformations in general.

Very recent developments in discrete integrable systems theory (discrete Painlevé equations in particular) and their connections to random matrix theory and random operators more generally, suggest some new potential applications of the above-mentioned perspective on Bäcklund transformations. Time permitting we will briefly discuss these possible applications; this is current work with Diane Holcomb and Dylan Murphy.

MONDAY, FEBRUARY 1

LECTURE AT 4:00 PM

COFFEE, TEA, AND REFRESHMENTS FROM 3:40 PM

ROOM 617, WACHMAN HALL

DEPARTMENT OF MATHEMATICS