



Speaker: Michael Gekhtman
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Thursday, September 22, 2011
2:00 PM
125 Hayes-Healy Hall

Title: From discrete integrable systems to cluster algebras and back

Abstract:

The pentagram map that associates to a projective polygon a new one formed by intersections of short diagonals was introduced by R. Schwartz and was shown to be integrable by V. Ovsienko, R. Schwartz and S. Tabachnikov. Recently, M. Glick demonstrated that the pentagram map can be put into the framework of the theory of cluster algebras.

In this talk I will explain that, in fact, discrete integrable systems that can be viewed as generalizations of the pentagram map are intrinsic to a certain class of cluster algebras that are related to weighted directed networks on a torus and a cylinder. After presenting necessary background information on Poisson geometry of cluster algebras, I will show how all ingredients necessary for integrability - Poisson brackets, integrals of motion - can be recovered from combinatorics of a network. I will conclude with a geometric interpretation of discrete systems obtained through this approach. This is a joint project with M. Shapiro, S. Tabachnikov and A. Vainshtein.