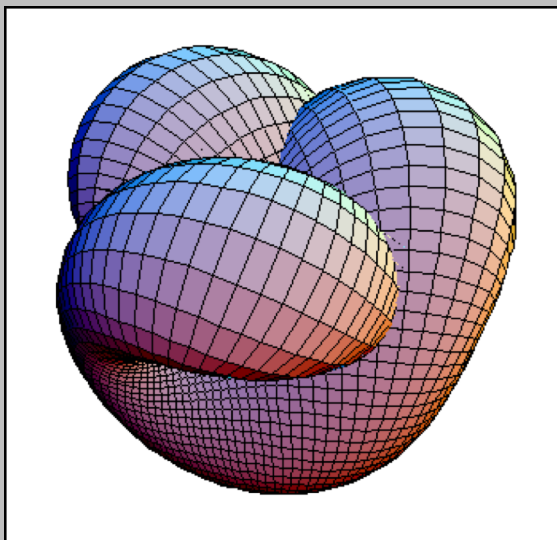


UCCS Department of Mathematics

Math Colloquium Series

DR. ALESSANDRO ARSIE
THE UNIVERSITY OF TOLEDO



DATE:

NOVEMBER 9, 2017

TIME:

12:30PM-1:30PM

(REFRESHMENTS AT 12:15PM)

LOCATION:

OSBORNE CENTER

#A327

Bi-flat F-manifolds and Integrable Conservation Laws - an overview

ABSTRACT: In recent years, integrable Hamiltonian and bi-Hamiltonian hierarchies of PDEs have appeared at the intersection of many areas of modern Mathematics, ranging from singularity theory, to differential geometry on the moduli space of curves, from Gromov-Witten invariants to orbit spaces of finite Coxeter groups and, of course applied problems.

In this talk, I will present a panoramic overview of the work I have done in collaboration with Paolo Lorenzoni in the last seven years to extend to the case of general (i.e. not bi-Hamiltonian nor in general even Hamiltonian) integrable conservation laws the current set-up and the aforementioned connections.

The first challenge consists in identifying a suitable geometric framework, generalizing Frobenius manifolds, that allows to deal with dispersionless integrable conservation laws. This is given by the notion of bi-flat F-manifolds. The second step will entail in extending the classical recurrence relations (the Lenardi-Magri scheme and the principal hierarchy scheme) to this more general set-up.

From the geometric point of view, I will describe some bi-flat F-manifolds counterparts of phenomena that appear in the case of Frobenius manifolds. For instance, I will detail how the orbit spaces of all finite well-generated complex reflection groups of rank 2 and 3 are equipped in general with families of bi-flat F-manifolds (Frobenius manifolds appear as special point within these families).

Finally, since one of the main goals is to produce dispersive integrable conservation laws, I will describe a deformation method, based on Poisson brackets on forms, rather than on functionals, that has been successfully implemented for scalar integrable conservation laws and up to some extent also in some case of systems. I will present some results for scalar and systems of integrable conservation laws, leaving the more detailed presentation about systems of integrable conservation laws and the notion of Miura invariant for the Colorado Nonlinear Day.

For more information please contact the UCCS Math Department at <http://www.uccs.edu/math>