University of Georgia
Department of Mathematics

Seminar Schedule
February 6 – February 10, 2006

All Seminars are held in Boyd Graduate Studies Bldg. unless otherwise noted.

MONDAY, February 6, 2006

Topology/Geometry
2:30pm, Room 222
Speaker: Will Kazez, University of Georgia
Title of talk: *Train tracks, branched surfaces and laminations*
Abstract: I will give an introductory talk leading up to a description of recent results of Skander Zannad on the existence of laminations supported by branched surfaces.

Algebra
2:30pm, Room 410
Speaker: Jon Kujawa, UGA
Title: *An algebraist does knot theory.*
Abstract: Knot invariants are intimately related to representations of Lie (super)algebras and their quantum groups. One such class of invariants are called weight systems or Vassiliev invariants. In particular, associated to each Lie (super)algebra one can construct a universal weight system. We will discuss some recent work in which we use an explicit calculation in the enveloping algebra of the Lie superalgebra gl(2|1) to obtain a recurrance relation for the universal weight system associated to gl(2|1) which allows one to inductively calculate the invariant. This universal weight system is of particular interest as it specializes to the Links-Gould invariant.

This talk will not assume any special knowledge of knot theory.

TUESDAY, February 7, 2006

VIGRE-Graduate Student Seminar
2:00p.m., Room 304
Speaker: Nathan Edington, University of Georgia
Title: *Computer Implementations of Five Important Approximations to Pi*
Abstract: We briefly introduce the historically significant and often surprisingly beautiful approximations to pi of Wallis, Newton, Gregory, Machin and Ramanujan. We then outline how these approximations were implemented in MATLAB and MathCAD in order to explore and compare the accuracy and rate of convergence of each approximation.

John Gosselin® Tea Social
3:00pm, Room 409
Coffee, Cookies, Tea

Colloquium
3:30pm, Room 302
Speaker: Xiaoqiang Wang, University of Minnesota
Title of talk: *Phase Field Models and Simulations of Vesicle Bio-Membranes*
Abstract: Recently, we began to systematically model and simulate the shape deformation of vesicle membranes using a unified energetic variational phase field method based on the minimization of elastic bending energy with volume and surface area constraints. Mathematical theory and numerical algorithms are developed to for the phase field models. Rigorous convergence theories of the numerical methods are investigated. Many simulations are carried out in static and dynamic, axis-symmetric and full 3D, one component and multi-component cases. The new phase field modeling approach has the advantage of avoiding tracking the free interfaces, and it can easily handle topological changes. Meanwhile, a series of formulae for retrieving the Euler number of the vesicles have been given and discussed which may be useful for detection and control purposes.

The 3D codes developed for the equilibrium shape deformations and the deformations and interactions with fluid fields allow us to conduct extensive computational studies. Both known and new equilibrium configurations have been discovered in our numerical simulations. A detailed examination of the energetic bifurcation landscape has been carried out. We have further studied the effect of the spontaneous curvature and have conducted simulations of vesicle transformations in fluids. The further development of the phase field approach for multicomponent vesicles gives us more tools to understand new and complex phenomena recently being experimentally studied by biologists.

WEDNESDAY, February 8, 2006

Geometry in the Curriculum Seminar
1:25pm, Aderhold, Room 111
Speaker: Thomas Banchoff, University of Georgia
Title of talk: *Teaching 3-dimensional geometry*

Algebraic Geometry
2:30pm, Room 410
Speaker: Valery Alexeev, University of Georgia
Title of talk: *"Complete moduli of branchvarieties".*
Abstract: I will present a brand new moduli space providing an alternative both to Hilbert scheme and to Chow variety. It classifies reduced varieties with a finite map to a fixed projective variety or scheme. Unlike the Hilbert scheme, only reduced varieties are used. Unlike the Chow variety, infinitesimal families are meaningful, in particular this

moduli space has a tangent space. Families of branch varieties have many more local invariants than families of subschemes. With some basic invariants fixed, the moduli space is proper. (Based on a joint work with A.Knutson)

John Gosselin® Tea Social
3:00pm, Room 409
Cookies, Coffee, Tea

Arithmetic Geometry/Number Theory
3:30pm, Room 304
No Meeting this week

VIGRE- Algebra
2:30pm, Room 303
Speaker: Lenny Chastkofsky, University of Georgia
Title of talk: *Cohomology computations and conjectures*

THURSDAY, February 9, 2006

VIGRE – Feynman Diagrams
2:00pm, Room 326

VIGRE – Cardiac Physiology
2:00pm, Room 640

VIGRE- Zeta Functions
2:15pm, Room 302

VIGRE-Algebraic Geometry
3:30pm, Room 324

FRIDAY, February 10, 2006

Probability Theory
2:30-3:30pm, Room 303
Speaker: David Prager, University of Georgia
Title of talk: *Early Exercise Premiums for American Index Options*