MATHEMATICS DEPARTMENT SEMINAR SCHEDULE
March 11 – March 15, 2002

All seminars are held in Boyd Graduate Studies unless otherwise noted.

MONDAY, March 11, 2002

Faculty and Graduate Social
3:00 p.m., Room 409
Coffee, Tea and Cookies

Joint Group Cohomology/Lie Theory Seminar
2:30 p.m., Room 302
Speaker: Georgia Benkart, University of Wisconsin, Madison
Title of talk: *"The Ups and Downs of Quantum Groups"*

Topology
3:00 p.m., Room 322
Speaker: Robert Gompf (University of Texas)
Title of talk: *"Topologically characterizing symplectic manifolds"*
Abstract: We discuss the notion of "hyperpencils" on smooth, closed, oriented manifolds. These are topological structures generalizing linear systems of curves on smooth, complex algebraic varieties. A hyperpencil on X determines a symplectic form on X up to isotopy. The resulting map from hyperpencils (up to deformation) to symplectic forms (up to isotopy and scale) is surjective in dimensions <8, and this is conjectured in higher dimensions as well. In dimensions where the conjecture holds, it provides a topological characterization of those manifolds admitting symplectic structures.

4:00 p.m., Room 322
Speaker: Andras Stipsicz (University of Eotvos)
Title of talk: *"Mapping class groups, Lefschetz fibrations and Stein fillings"*
Abstract: Using the correspondence between certain factorizations of elements in the mapping class group, we show how symplectic topologic properties of certain Lefschetz fibrations are reflected in the algebraic structure of mapping class groups. Similar methods constraint the topology of Stein surfaces with fixed contact boundary, corresponding to factorizations of monodromy elements in mapping class groups of surfaces with nonempty boundary.

Number Theory
3:30 p.m., Room 304
Speaker: TBA
Title of talk: *"TBA"*

Numerical Analysis
3:30 p.m., Room 410
Speaker: Okkyung Cho, University of Georgia
Title of talk: *"Construction of Biorthogonal Wavelets"*
Abstract: In this talk, we discuss how to construct concrete examples of biorthogonal wavelets.

CATS
4:40 p.m., Room 306
Speaker: Rubao Ji, Graduate Student in Computer Science
Title of talk: *"Approximating the Minimum Number of Edges for a 2-Edge-Connected Spanning Subgraph"*
Abstract: Given a graph, how does one find the smallest (i.e. minimum number of edges)2-Edge-Connected spanning subgraph? Unfortunately, the problem is know to be NP-hard. I will present an algorithm developed by Khuller and Vishkin (1994), which can guarantee a solution that is no more than 3/2 times the optimal. The algorithm (and its analysis) depend upon a stucture called a tree-carving. Also, they found that apporximating the optimal solution to within an additive constant is NP-hard.

TUESDAY, March 12, 2002

VIGRE
2:00 p.m-3:15 p.m., Room 304
Speaker: David Gay, University of Arizona
Title of talk: *"Fibered links, vector fields, and maps from S^3 to S^2"*

Algebraic Geometry
3:30 p.m., Room 326
No Meeting this week

Analysis
3:30 p.m., Room 304
No Meeting this week

Student Number Theory
3:30 p.m., Room 302
Speaker: Xander Faber, UGA
Title of talk: *"Two dimensional Kakeya sets over finite fields: connecting the dots (as few as possible)"*
Abstract: Before I describe the problem, let me say that the question as well as all of the tools I'll be applying to it are elementary in nature. This should be a good talk for a general audience (e.g. first year students interested in number theory).

We can view the Cartesian product of two copies of a finite field as a discrete (and finite) torus. If we then decide that we'd like to draw a line in every "direction" on our torus, how much of the space do we cover?

More precisely, the space described above has q^2 points if we consider the field of q elements. It is very easy to prove that a set with a line in each direction must have at least $q^2 / 2$ points in it, but what is the right lower bound?

I'll present the result for q even, and I'll give some ideas for how to get the right answer for q odd.

WEDNESDAY, March 13, 2002

Group Representation and Cohomology
2:30 - 3:20, Room 410
Speaker: TBA
Title of talk: *"TBA"*

UGA Math Club Problem Solving Group
2:30 p.m., Room 302

Faculty and Graduate Social
3:00 p.m., Room 409
Coffee, Tea, Cookies

Arithmetic Geometry
3:30 p.m., Room 304
No Meeting this week

FRIDAY, March 15, 2002

Geometry
2:30 p.m., Room 322
Speaker: Jason Cantarella, University of Georgia
Title of talk: *"Upper bounds for ropelength from arc-presentations"*
Abstract: Given an n-crossing knot, how much rope does it take to tie it? Johnston has given the bound

Ropelength < 25 (Crossing Number)^2,

which was improved by Cantarella, Kusner, and Sullivan to

Ropelength < 12 (Crossing Number)^2.

Both these bounds were based on graph drawing theorems. Using Cromwell's arc-presentations, we show

Ropelength < 1.2 (Crossing Number)^2 + O(Crossing Number).

We still think that O(n^2) is too big an order of magnitude...