MATHEMATICS DEPARTMENT SEMINAR SCHEDULE
September 10-14, 2001

MONDAY, September 10, 2001

Group Representation & Cohomology
2:30 - 3:30 p.m., Room 410
Speaker: Dave Benson, University of Georgia
Title of talk: *"Homotopy Finite Group Theory"*

Number Theory
3:30 p.m., Room 304
Speaker: Nathan Ng, University of Georgia
Title of talk: *"Introduction to the Riemann Zeta Function"*

Analysis
2:30 p.m., Room 322
Speaker: Akos Magyar, University of Georgia
Title of talk: *"On polynomial ergodic theorems"*
Abstract: We start by discussing some standard results ergodic theory, related to the notion of amenability. Then we consider the case of commuting transformations, where the averages are taken over subsets of integer points defined by polynomials. In the second talk we study similar problems when the transformations are non-commuting but generate discrete nilpotent groups.

The emphasis is on the related maximal operators, and how those can be described in terms of exponential sums similar to ones considered in number theory.

TUESDAY, September 11, 2001

VIGRE
Room 302, 2:00 p.m.-3:15 p.m.
Speaker: Marcus Hunziker, University of Georgia
Title of talk: *"Quantum games and quantum algorithms"*
Abstract: Captain Picard and Q are bored on starship Enterprise. So Q brings a coin and invites Picard to play the following game: Picard should take the coin and place it in a small box, head up. Q is then allowed to reach into the box and change the state of the coin or leave it as it is. After that, Picard is allowed to do the same: without looking at the coin he can either flip it or leave it in its current state. Finally, Q without peeking may reach into the box one more time and change the state of the coin or leave it as it is. Then the box is opened and Q wins if the coin is head up. Picard thinks for a moment and agrees to play the game. They repeat the game over and over again. Q always wins. How does he do it?

The purpose of this talk is to give an introduction to quantum computing and then to explain the mystery behind the game above (which is due to David Meyer from UC San Diego).

Algebraic Geometry
3:30 p.m., Room 326
Speaker: Jihun Park, University of Georgia
Title of talk: *"Birational maps of local Del Pezzo fibrations"*

Student Number Theory
3:30 p.m., Room 303
No Meeting this week

WEDNESDAY, September 12, 2001

Group Representation & Cohomology
2:30 - 3:30 p.m., Room 410
Speaker: Dave Benson, University of Georgia
Title of talk: *"Homotopy Finite Group Theory", continued*

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

Numerical Analysis
3:30 - 4:30, Room 410
Speaker: Gerard Awanou, University of Georgia
Title of talk: *"Numerical solution of 3D Poisson equations"*
Abstract: We show how to use trivariate spline functions of any degree and any smoothness over any polygonal domains for solving 3D Poisson equations with Dirichlet boundary condition. Some numerical examples will be demonstrated.

Representation Theory
3:30 p.m., Room 524
Speaker: Bill Graham, University of Georgia
Title of talk: "*Introduction to Kazhdan-Lusztig polynomials"*
Abstract: In two famous papers, Kazhdan and Lusztig introduced what are now called Kazhdan-Lusztig polynomials, related them to the singularities of Schubert varieties, and conjectured that these polynomials compute multiplicities in representations. This has led to a great expansion of the interaction between geometry and representation theory. In this talk I will give an introduction to these polynomials. The talk will be accessible to those without much background in Lie theory.

CATS
4:40pm, Rm. 306 Boyd Graduate Studies
Speaker: Aaron Windsor, Graduate Student, Computer Science Dept.
Title of talk: *" (k,l)-systems"*
Abstract: Fix a ground set G. A (k,l)-system on G is a set of pairs (A_i,B_i), where
(i) A_i is a size k subset of G and B_i is a size l subset of G,
(ii) A_i and B_j have a non-empty intersection for i not equal to j,
and
(iii) A_i and B_j have an empty intersection for i equal to j.

How big can (k,l)-systems be? We'll look at a tight upper bound for the number of pairs in (k,l)-systems due to Bollobas, and then see what happens when we relax restriction (ii). All of the proofs involve probabilistic techniques.

THURSDAY, September 13, 2001

VIGRE Seminar
2:00 p.m., Room 302
No Seminar today

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

COLLOQUIUM
3:30 p.m., Room 304
Speaker: Mitch Rothstein and Michael Geller, University of Georgia
Title of talk: "*Quantum Computing and Communication"*
Abstract: Quantum computing and quantum information science are new multidisciplinary subjects of great interest to university researchers and of great importance to government agencies and the information and technology industries. Quantum computing refers to the possibility of building a computer out of elements, called quantum logic gates, whose operation exploits the laws of quantum mechanics to perform operations prohibited by conventional or classical logic gates. Quantum information science refers to the use of quantum properties of matter to quantify, store, encode, and communicate information.

In this talk we will give a brief introduction to these subjects, which will be the focus of a conference that will take place at the Georgia Center for Continuing Education, on Friday September 21 and Saturday September 22.

FRIDAY, September 14, 2001

Special Analysis Seminar
11:00a.m. Room 410
Speaker: Chris Phillips, University of Oregon
Title of talk: *"Real and stable rank for crossed products of the Cantor set by actions of* $\boldsymbol{Z}^d$*"*

Geometry
2:30 p.m., Room 322
No Meeting this week