Tuesday, September 05, 2017

3:00pm-4:00pm  **Student Geometry/Topology** -- () Planning meeting -- 1866 East Hall
4:00pm-12:00am **Special Events** -- Fall Faculty Meeting () Fall Faculty Meeting and Reception, 2017 -- 1360 East Hall

Wednesday, September 06, 2017

4:00pm-5:00pm  **Financial/Actuarial Mathematics** -- Xunyu Zhou (Columbia University) *Time Inconsistency, Self Control and Portfolio Choice* -- 1360 East Hall
4:00pm-5:30pm  **RTG Seminar on Geometry, Dynamics and Topology** -- N/A () Organizational meeting -- 3866 East Hall

Thursday, September 07, 2017

3:00pm-4:00pm  **Commutative Algebra** -- () Organizational meeting -- 3096 East Hall
4:00pm-5:00pm  **Differential Equations** -- Tai-Ping Liu (Stanford University and Academia Sinica, Taipei) *Hopf-Cole Transformation* -- 4088 East Hall
4:00pm-5:50pm  **Preprint Algebraic Geometry Seminar** -- () Organizational meeting -- 1866 East Hall

Friday, September 08, 2017

3:00pm-4:00pm  **Applied Interdisciplinary Mathematics** -- Victoria Booth (University of Michigan) *Piecewise smooth maps for the circadian modulation of sleep-wake dynamics* -- 1084 East Hall
3:10pm-4:00pm  **Student Algebraic Geometry** -- () Organizational Meeting -- 3096 East Hall
4:00pm-5:30pm  **Arithmetic Geometry Learning Seminar** -- () Organizational meeting -- 1866 East Hall
4:10pm-5:00pm  **Combinatorics** -- Brendon Rhoades (UC San Diego) *Ordered set partitions, generalized coinvariant algebras, and the Delta Conjecture* -- 4088 East Hall
4:10pm-5:00pm  **Student AIM Seminar** -- Joseph Kraisler (University of Michigan) *The Gaussian Integral* -- 1084 East Hall
Abstracts for the week of September 3rd, 2017 - September 9th, 2017

Student Geometry/Topology
Tuesday, September 05, 2017, 3:00pm-4:00pm
1866 East Hall
()
Planning meeting

Special Events
Tuesday, September 05, 2017, 4:00pm-12:00am
1360 East Hall
Fall Faculty Meeting ()
Fall Faculty Meeting and Reception, 2017

All are invited and encouraged to attend the Fall Faculty Meeting to kick off the new academic year. There will be a brief discussion of some announcements, then introductions of new postdocs.

There will be a reception immediately following the meeting. Refreshments will be served.

Financial/Actuarial Mathematics
Wednesday, September 06, 2017, 4:00pm-5:00pm
1360 East Hall
Xunyu Zhou (Columbia University)
Time Inconsistency, Self Control and Portfolio Choice

Time inconsistency arises when one's preferences are not aligned over time; thus time-inconsistent dynamic control is essentially a self control problem. In this talk I will introduce several classes of time-inconsistent dynamic optimisation problems together with their economic motivations, and highlight the ways to address the time inconsistency. I will then provide a solution to a continuous-time portfolio choice model under the rank-dependent utility which is inherently time inconsistent.

RTG Seminar on Geometry, Dynamics and Topology
Wednesday, September 06, 2017, 4:00pm-5:30pm
3866 East Hall
N/A ()
Organizational meeting

Organizational meeting to discuss format and topics of the seminar for the rest of the semester.
Commulative Algebra  
**Thursday, September 07, 2017, 3:00pm-4:00pm**  
3096 East Hall  
()  
*Organizational meeting*  

We will schedule the talks for this semester. Everyone interesting in speaking is welcome to attend.

Differential Equations  
**Thursday, September 07, 2017, 4:00pm-5:00pm**  
4088 East Hall  
Tai-Ping Liu (Stanford University and Academia Sinica, Taipei)  
*Hopf-Cole Transformation*  

The Hopf-Cole transformation turning the strongly nonlinear Burgers equation into the linear heat equation plays an important role in the development of mathematical sciences. In this talk the transformation is viewed from historical perspective. Some open problems concerning the application of the Hopf-Cole transformation are also raised.

Preprint Algebraic Geometry Seminar  
**Thursday, September 07, 2017, 4:00pm-5:50pm**  
1866 East Hall  
()  
*Organizational meeting*
Applied Interdisciplinary Mathematics
Friday, September 08, 2017, 3:00pm-4:00pm
1084 East Hall
Victoria Booth (University of Michigan)

Piecewise smooth maps for the circadian modulation of sleep-wake dynamics

The timing of human sleep is strongly modulated by the 24 h circadian rhythm, and desynchronization of sleep-wake cycles from the circadian rhythm can negatively impact health. We have developed a physiologically-based mathematical model for the neurotransmitter-mediated interactions of sleep-promoting, wake-promoting and circadian rhythm-generating neuronal populations that govern sleep-wake behavior in humans. To investigate the dynamics of circadian modulation of sleep patterns and of entrainment of the sleep-wake cycle with the circadian rhythm, we have reduced the dynamics of the sleep-wake regulatory network model to a one-dimensional map. The map dictates the phase of the circadian cycle at which sleep onset occurs on day \( n + 1 \) as a function of the circadian phase of sleep onset on day \( n \). The map is piecewise continuous with discontinuities caused by circadian modulation of the duration of sleep and wake episodes and the occurrence of rapid eye movement (REM) sleep episodes. Analysis of map structure reveals changes in sleep patterning, including REM sleep behavior, as sleep occurs over different circadian phases. In this way, the map provides a portrait of the circadian modulation of sleep-wake behavior and its effects on REM sleep patterning. Using the map, we are analyzing effects of sleep deprivation and bifurcations of the sleep-wake regulatory network model to understand how variations in the homeostatic sleep drive affect human sleep patterning over development.

Student Algebraic Geometry
Friday, September 08, 2017, 3:10pm-4:00pm
3096 East Hall

Organizational Meeting

The student algebraic geometry seminar is having our organizational meeting this Friday, September 8th from 3:10-4pm in East Hall 3096. This semester, the plan is for all talks to be accessible to the students currently enrolled in Math 631. We are always looking for people who might like to speak or contribute ideas for talks, and all are welcome to attend! There will also be cookies.

Arithmetic Geometry Learning Seminar
Friday, September 08, 2017, 4:00pm-5:30pm
1866 East Hall

Organizational meeting
Combinatorics
Friday, September 08, 2017, 4:10pm-5:00pm
4088 East Hall
Brendon Rhoades (UC San Diego)

Ordered set partitions, generalized coinvariant algebras, and the Delta Conjecture

Consider the action of the symmetric group $S_n$ on the polynomial ring $Q[x_1, \ldots, x_n]$ by variable permutation. The coinvariant algebra $R_n$ is the graded $S_n$-module obtained by modding out $Q[x_1, \ldots, x_n]$ by the ideal generated by $S_n$-invariant polynomials with vanishing constant term. The algebraic properties of $R_n$ are governed by the combinatorial properties of permutations. We will introduce and study a family of graded $S_n$-modules $R_{n,k}$ which reduce to the coinvariant algebra when $k = n$. The algebraic properties of the $R_{n,k}$ are governed by ordered set partitions of $\{1, 2, \ldots, n\}$ with $k$ blocks. We will generalize results of E. Artin, Garsia-Stanton, Chevalley, and Lusztig-Stanley from $R_n$ to $R_{n,k}$. The modules $R_{n,k}$ are related to the "Delta Conjecture" in the theory of Macdonald polynomials. Joint with Jim Haglund and Mark Shimozono.

Student AIM Seminar
Friday, September 08, 2017, 4:10pm-5:00pm
1084 East Hall
Joseph Kraisler (University of Michigan)

The Gaussian Integral

The Gaussian integral appears in many fields of mathematics, statistics, and physics. We will derive the value of this definite integral in several ways, while surveying some important topics in applied mathematics including asymptotics, contour integration and Fourier transforms.