### Bay Area Differential Geometry Seminar

**Saturday, May 9, 2009**

**University of California, Santa Cruz**

**Baskin Engineering Building, Room 301A**

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<td>10:00 - 11:00</td>
<td>Coffee and treats</td>
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| 11:00 - 12:00 | **Jie Qing**—UC-Santa Cruz  
**Title:** Scattering on conformally compact Einstein manifolds  
**Abstract:** I will introduce the scattering operators on conformally compact Einstein manifolds based on the recent work of Graham and Zworski. A conformally compact Einstein manifold comes with a conformal manifold as its conformal infinity. I will show scattering operators, as spectral property of the bulk space, in many ways are related to global conformal property of the infinity. I will, in particular, talk about a recent joint work with Colin Guillarmou on the relation of the location of scattering poles and the Yamabe constant of the conformal infinity. |
| 12:00 - 2:00 | Lunch                                                              |
| 2:00 - 3:00 | **John Morgan**—Columbia & Stanford  
**Title:** The Poincaré Conjecture and the Geometrization of 3-manifolds  
**Abstract:** The Poincaré Conjecture that a closed, simply connected 3-manifold is homeomorphic to the 3-sphere has been the motivating question in geometric topology since it was formulated in 1904. Amazingly, over the next 99 years there was tremendous progress on various generalizations of Poincaré’s question, to questions about the role of the fundamental group in 3-manifold topology, and to questions about manifolds in higher dimensions. In spite of this, there was no progress on Poincaré’s question. Finally, in 2003, motivated by Thurston's Geometrization Conjecture, which generalizes the Poincaré Conjecture by asserting that all 3 manifolds are accounted for by homogeneous geometric ones, and building on work of R. Hamilton on an evolution equation for Riemannian metrics, the so-called Ricci flow equation, Perelman resolved in the affirmative both the Poincaré Conjecture and Thurston's Geometrization Conjecture.  
In this talk, we will discuss Thurston's Geometrization Conjecture, Hamilton’s approach using Ricci flow, and discuss briefly some of the obstacles that Perelman had to deal with, most importantly finite-time singularity development in Ricci flow, in order to prove these results. |
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<td>3:00 – 3:40</td>
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| 3:40 – 4:40 | - Zhiqin Lu—UC-Irvine  
  **Title:** Gauss-Bonnet theorem on moduli spaces.  
  **Abstract:** In this talk, I show the proof of the Gauss-Bonnet-Chern theorem on moduli space of polarized Kahler manifolds. Using the results, I show the proof the rationality of the Chern-Weil forms (with respect to the Weil-Petersson metric) on CY moduli.  
  As an application in physics, by the Ashok-Douglas theory, counting the number of flux compactifications of the type IIb string on a Calabi-Yau threefold is related to the integrations of various Chern-Weil forms. I will show that all these integrals are finite (and also rational).  
  This is joint with Michael R. Douglas. |
| 6:30     | **Dinner** at Richard and Judith Montgomery’s house. Spouses and significant others are invited. |

Parking behind Baskin Engineering, or in the nearby parking structure (within sight of Baskin Engineering). Here’s a map: [http://maps.ucsc.edu/cmbaskin.html](http://maps.ucsc.edu/cmbaskin.html)

For those wanting to stay overnight:

The Dream Inn [http://www.jdvhotels.com/hotels/dream](http://www.jdvhotels.com/hotels/dream) will give you the UCSC rate if you tell them about the meeting.  
Reservation phone: (866) 774-7735

The Ocean Pacific Lodge [http://www.theoceanpacificlodge.com/](http://www.theoceanpacificlodge.com/) is also a decent place to stay, near the ocean  
Phone: (831) 457-1234