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# Hong Kong Geometry Colloquium

February 4, 2017 (Saturday)

Room 502a, Academic Building No. 1, CUHK

## Globalizing localized mirror functors - the case of punctured Riemann surfaces

Professor Cheol-Hyun CHO  
*Seoul National University, Korea*

9:45am – 10:45am

Abstract: The homological mirror symmetry of punctured Riemann surfaces has been well-studied and proved by Abouzaid et al, Bocklandt and recently by Heather Lee. We provide a different and constructive approach based on the localized mirror formalism of myself, Hong and Lau. We first construct functors from Fukaya category of the punctured Riemann surface to the matrix factorization categories of each local charts of the mirror LG model on toric Calabi-Yau manifold using immersed Lagrangians in the pairs of pants decomposition, and glue these functors to obtain a global mirror functor.

## Chern-Simons theory for Galois representations

Professor Jeehoon PARK  
*POSTECH, Korea*

11:00am – 12:00noon

Abstract: The Chern-Simons theory is a gauge theory which is a version of (2+1)-dimensional TQFT (topological quantum field theory). It provided a useful framework and tools to understand the topology of knots in a 3-manifold, for example, the Jones polynomial of knots. The arithmetic Chern-Simons theory for Galois representations, initiated by Minhyong Kim, is an arithmetic analogue of the Chern-Simons theory, which is expected to attack the number theory problem (Galois theory problem, L-functions, Iwasawa theory, and etc) guided by physics (quantum field theory) and topology principles and techniques appearing in the Chern-Simons theory. In this talk, we will briefly explain the analogy between primes in a number field and knots in a 3-manifold, and define the arithmetic Chern-Simons action. Then we will provide its arithmetic application to a certain Galois embedding problem based on an explicit computation of the arithmetic Chern-Simons action. This is a joint work with Hee-Joong Chung, Dohyeong Kim, Minhyong Kim, and Hwajong Yoo.

*There is a tea break at 10:45am and lunch at 12:00noon.*

*This event is partially supported by "Programme on Geometric Analysis".*

*All are Welcome*