

# Tokyo One-Day Workshop on Stochastic Analysis and Geometry

**Date :** 23 November, 2018 (Friday) 13:00 ~ 17:40

**Venue :** Room 126, Graduate School of Mathematical Sciences, The University of Tokyo,  
3-8-1, Komaba, Meguro-ku, Tokyo 153-8914, Japan

## —Program—

**13:00~14:00 Atsushi Atsuji (Keio University)**

### **Default functions and value distribution of holomorphic maps**

**Abstract:** Recently default functions are playing important roles in the theory of mathematical finance. We consider another aspect of the functions, specially we consider a function theoretic aspect. We show the vanishing of default functions of the Dirichlet processes generated by a class of subharmonic functions implies Liouville type theorems. Consequently we will see some value distributional properties of holomorphic maps.

**14:10~15:10 Robert Neel (Lehigh University)**

### **Minimal submanifolds and surfaces and associated martingales**

**Abstract:** We first discuss a class of degenerate martingales (which we will call rank- $n$  martingales) that arises naturally as the diffusion associated with minimal submanifolds and, more generally, mean curvature flow. This provides a unified approach to “coarse” properties, such as transience, of such structures, via methods which naturally generalize those used to study the long-time behavior of Brownian motion on Cartan-Hadamard manifolds. We then specialize to minimal surfaces in  $\mathbb{R}^3$ , in which case the associated rank-2 martingale (which is just Brownian motion on the surface, viewed as a process in  $\mathbb{R}^3$ ) has the additional property that the tangent plane also evolves as a martingale. Taking advantage of this extra structure, we develop an extrinsic analogue of the mirror coupling of two Brownian motions. This allows us to study finer geometric and analytic properties of minimal surfaces, such as intersection results (strong halfspace-type theorems) and Liouville properties.

**15:30~16:30 Jun Masamune (Hokkaido University)**

**On convergence of elliptic operators on a Riemannian manifold**

**Abstract:** In this talk we study the asymptotic behavior of second-order uniformly elliptic operators on weighted Riemannian manifolds. We appeal to the notion of  $H$ -convergence introduced by Murat and Tartar. In our main result we establish an  $H$ -compactness result that applies to elliptic operators with measurable, uniformly elliptic coefficients on weighted Riemannian manifolds. This is a joint work with Helmer Hoppe and Stefan Neukamm.

**16:40~17:40 Shigeki Aida (The University of Tokyo)**

**Weak Poincaré inequalities on path spaces : non-explosion case**

**Abstract:** We prove weak Poincaré inequalities on path spaces over a complete Riemannian manifolds. Feng-Yu Wang and his collaborators proved the inequality under certain assumption on the Ricci curvature which implies naturally non-explosion of the Brownian motion. We explain how to prove such an inequality under the non-explosion of the Brownian motion.

Organizers: Shigeki Aida (The University of Tokyo), Hiroshi Kawabi (Keio University)