1114-60-192   **Henry O Schellhorn*** (`henry.schellhorn@cgu.edu`), 710 N. College, Claremont, CA 91711, and **Qidi Peng** and **Sixian Jin**. *A new representation theorem for smooth Lévy martingales.*

We show that, under certain smoothness conditions, a Lévy martingale, when evaluated at a fixed time, can be represented as an exponential of its value at a later time. The time-dependent generator of this exponential operator is equal to one half times the second order Malliavin derivative, when the underlying Lévy process is Brownian motion, and equal to the integral of the Malliavin derivative with respect to the Lévy measure when the underlying process is a Lévy jump process. The exponential operator can be calculated explicitly in a series expansion, which resembles the Dyson series of quantum field theory. For Brownian motion, this result can be seen as a generalization of the semi-group theory of parabolic partial differential equations to the parabolic path-dependent partial differential equations introduced by Dupire (2009) and Cont and Fournié (2011). We suggest open problems that might be solved by using our result: regularity of the solution of backward stochastic differential equations, and representation of the solution of some types of Schrodinger equations. The talk is based on joint work with Qidi Peng, Sixian Jin, and Josep Vives. (Received August 26, 2015)