



**You are cordially invited to attend the following seminar sponsored by
the Department of Mechanical Engineering:**

**Friday, September 11, 2009
114 Spencer Lab, 12:15 PM**

*Gregory S. Chirikjian
Johns Hopkins University*

“Stochastic Models, Lie Groups, and Engineering”

Abstract:

The theory of random processes is used in a wide variety of applications ranging from modeling physical Brownian motion to control theory. Many stochastic problems of interest in engineering and biology involve random rigid-body motions, which is an example of a stochastic process on a Lie group. In this talk, a variety of stochastic phenomena that evolve on Lie groups will be discussed. These include the statistical mechanics of DNA and other biopolymers, mobile robot path planning, and manipulator inverse kinematics. Techniques from noncommutative harmonic analysis (i.e., Fourier analysis on Lie groups) are employed to solve evolution equations on Lie groups that arise in applications. It will be shown how these topics relate to robotics, and discussion and videos of “self-replicating robots” built by the speaker's students will be presented.

Refreshments will be served

Bio:

Gregory S. Chirikjian received undergraduate degrees from Johns Hopkins University in 1988, and the Ph.D. degree from the California Institute of Technology, Pasadena, in 1992. Since 1992, he has been on the faculty of the Department of Mechanical Engineering, Johns Hopkins University, where he is now professor. From 2004-2007 he served as department chair. His research interests include robotics, applications of group theory in a variety of engineering disciplines and the mechanics of biological macromolecules. He is a 1993 National Science Foundation Young Investigator, a 1994 Presidential Faculty Fellow, and a 1996 recipient of the ASME Pi Tau Sigma Gold Medal. In 2008 he became a Fellow of the ASME and a Senior Member of the IEEE. He is an author of the book “Engineering Applications of Noncommutative Harmonic Analysis” (CRC Press, 2000) and the recent book “Stochastic Models, Information Theory, and Lie Groups” (Birkhauser, 2009).