Abstract:

In Math 20, we learned how to differentiate and integrate functions defined on Euclidean spaces. There is a much wilder world of smooth spaces (manifolds) where a generalization of this calculus is possible, but it requires a steep learning curve and a lot of new language to understand. There is a class of manifolds, however, that is both large and interesting, and also retains enough Euclidean-like structure to do calculus almost the same way as in Math 20. These are called Lie groups.

I will discuss (with two or three guiding examples) how to do calculus on Lie groups, which can usually be realized as groups of square matrices. I will then discuss the most important differential equation in the world – the heat equation – in the context of matrix Lie groups, and the beautiful interplay between geometry and heat flow. Finally, I’ll talk about my research into the heat flow of eigenvalues in matrix Lie groups – and there’ll be lots of cool pictures.

Organizer: Brendon Rhoades

Tuesday, October 25, 2016
12:00 PM
AP&M B402A