Joseph Fels Ritt Lectures
Spring 2024

Professor Blaine Lawson (Stony Brook)

First Lecture: *On compact minimal surfaces in S^3*

Abstract: I will present a construction of compact minimal surfaces in the Euclidean three-sphere. In the orientable case, surfaces of every genus can be minimally embedded. In the non-orientable case, every surface but the real projective plane can be minimally immersed. For the projective plane, no such immersion exists.

These surfaces have some charm, and they also relate to the general topic of singularities of minimal three-folds in four dimensional spaces. This work was inspired many years ago by Professor Eugenio Calabi.

Second Lecture: *Nonlinear PDE's and Potential Theories*

1) How does one deal with a partial differential equation when there is no natural operator?

2) Given a differential operator, are there other operators with the same solutions but different useful properties? In fact can one radically change the operator to something tractable, in a way that enables solving the original equation?

3) Does the space of subsolutions (or, equivalently, the space of supersolutions) give rise to a potential theory where interesting and relevant theorems can be proved?

These questions arose in my work with Reese Harvey. We discovered that while calibrated manifolds do not usually have analogues of the holomorphic functions that exist in the Kähler case, they do have analogues of plurisubharmonic functions. This started a long investigation. I will discuss various highlights of that work, and also some responses to these questions.

Thursday, February 15 @ 4:30 PM (407 MATH)

Friday, February 16 @ 2:00 PM (312 MATH)