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**Krieger-Nelson Prize Lecture**  
**Conférence - Prix Krieger-Nelson**

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*An eigenvalue problem and minimal surfaces in the ball*

Beginning with the work of J. Hersch for the two sphere and that of P. Li and S. T. Yau for more general surfaces, the question of determining surfaces of fixed area which maximize the first eigenvalue has been actively studied. In this talk we will describe recent work with R. Schoen concerning extremal eigenvalue questions for surfaces with boundary. In both cases the eigenvalue problems are related to minimal surface questions. For closed surfaces these are minimal surfaces in spheres while for surfaces with boundary they are related to minimal surfaces in the ball satisfying a natural boundary condition. We will describe the extremal surfaces in the genus zero case.