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[www.crm.math.ca/Schoen](http://www.crm.math.ca/Schoen)

**Lundi, 27 février 2012, 16h00 / Monday, February 27, 2012, 4:00 pm**

Salle – Room 1355

Centre de recherches mathématiques, Pavillon André-Aisenstadt,  
Université de Montréal, 2920, chemin de la Tour



**Cette conférence s'adresse à un large auditoire / Suitable for a general audience**

## The Geometry of Positive Curvature

This will be a survey of Riemannian manifolds of positive curvature, summarizing what we know about them and what is conjecturally true. We will describe the optimal sphere theorems which have been obtained over the past five years. We will describe some of the techniques which have been employed in the theory including geodesic techniques, minimal surface techniques, and the Ricci flow.

UNE RÉCEPTION SUIVRA LA CONFÉRENCE AU SALON MAURICE-L'ABBÉ, PAVILLON ANDRÉ-AISENSTADT (SALLE 6245).

A RECEPTION WILL FOLLOW AT THE SALON MAURICE-L'ABBÉ, PAVILLON ANDRÉ-AISENSTADT (ROOM 6245).

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**Mercredi, 29 février 2012, 16h00 / Wednesday, February 29, 2012, 4:00 pm**

Salle – Room 6214

Centre de recherches mathématiques, Pavillon André-Aisenstadt,  
Université de Montréal, 2920, chemin de la Tour

## An Extremal Eigenvalue Problem for Surfaces with Boundary

The question of determining surfaces of fixed area which maximize the first eigenvalue is a very active field of investigation. In this talk we will describe recent work with A. Fraser 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.

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**Vendredi, 2 mars 2012, 16h00 / Friday, March 2, 2012, 4:00 pm**

Salle – Room 6214

Centre de recherches mathématiques, Pavillon André-Aisenstadt,  
Université de Montréal, 2920, chemin de la Tour

## A New Mean Curvature Proof of the Spacetime Positive Mass Theorem

We describe recent joint work with Michael Eichmair, Lan-Hsuan Huang, and Dan Lee. The original Schoen/Yau mean curvature proof of the general positive mass theorem only gave directly the positivity of energy. We give a direct proof of the timelike character of the total energy momentum vector using the MOTS equation. We also improve the density theorems for initial sets satisfying the dominant energy condition.