

# Perelman's work on the Poincaré Conjecture

In late 2002 Grigori Perelman of the Steklov Institute of Mathematics in St. Petersburg posted the first of a series of papers on ArXiv.org announcing far-reaching new results. If verified, they would solve both the Poincaré conjecture and William Thurston's geometrization conjecture. The method follows that proposed by Richard Hamilton in his work on the Ricci Flow equations. Perelman posted his papers on November 11 of 2002, and March 10 and July 17 of 2003.

Perelman lectured on his work at MIT on April 7, 9 and 11, 2003 and at SUNY on April 21, 2003. Since then, many workshops and conferences have been held to discuss these remarkable developments.



The Clay Mathematics Institute has taken several initiatives to advance the understanding and dissemination of Perelman's work.

- ◆ At the 2003 CMI Annual Meeting held November 14, 2003, at the Massachusetts Institute of Technology, public talks were presented by Richard Hamilton and John Morgan, both of Columbia University. They spoke on the Ricci Flow equations and their consequences, and on Perelman's work on the Poincaré conjecture and geometrization of 3-manifolds.
- ◆ In 2004, CMI appointed Bruce Kleiner and John Lott, both of the University of Michigan, as Clay Research Scholars to support their work in writing a detailed set of notes on Perelman's second paper, "Ricci flow with surgery on three-manifolds." These will be made publicly available, as were their notes on the first paper, "The entropy formula for the Ricci flow and its geometric applications."

CLAY MATHEMATICS INSTITUTE  
ANNUAL MEETING

A Celebration of the Universality of Mathematical Thought

$$\frac{d}{dt} g_{ij}(t) = -2R_{ij}$$

Friday, November 14  
2:00 - 5:00 PM  
MIT Media Lab  
Bartos Auditorium  
(lower level of the  
Wiesner Building)  
20 Ames Street  
Cambridge, MA

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Presentation  
of the Clay  
Research Awards

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RICHARD HAMILTON  
The Ricci Flow

JOHN MORGAN  
Perelman's work on the Poincaré  
Conjecture and Geometrization  
of 3-manifolds

OPEN TO THE PUBLIC

For more  
information:  
[www.claymath.org](http://www.claymath.org)

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- ◆ CMI's 2005 summer school will be held at Berkeley with MSRI on the subject of Ricci flow and Perelman's work. The organizing committee is Gang Tian (Chair), Ben Chow, Tobias Colding, John Lott, John Morgan, with Jim Carlson, David Ellwood, and Hugo Rossi serving *ex officio*.
- ◆ In late 2004, CMI will publish *The Millennium Prize Problems*, a book featuring the seven official descriptions of the problems, of which the Poincaré conjecture is one. Early versions of the article on the Poincaré conjecture by John Milnor of Stony Brook have appeared in the 2002 CMI annual report and in the November 2003 *Notices of the American Mathematical Society*.

We look forward to the work of the individuals and groups who are studying Perelman's papers.

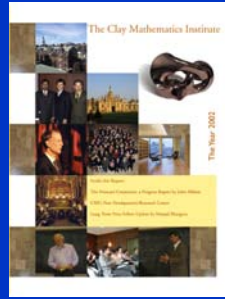
Pour ne pas trop allonger ce travail, je me bornerai à énoncer le théorème suivant dont la démonstration demanderait quelques développements :

Tout polyèdre qui a tous ses nombres de Betti égaux à 1 et tous ses tableaux  $T_i$  bilatères est simplement connexe, c'est-à-dire homéomorphe à l'hypersphère.

Henri Poincaré, *Oeuvres*, tome vi, Paris, 1953



*View from One Bow Street*



*The first CMI Annual Report*



*The Institute's offices at One Bow Street*

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The CMI Annual Report is distributed to members of the mathematical community, including CMI fellows and friends.

### **Mission Statement**

The primary objectives and purposes of The Clay Mathematics Institute (CMI) are:

- to increase and disseminate mathematical knowledge,
- to expose mathematicians and other scientists to new discoveries in the field of mathematics,
- to encourage gifted students to pursue mathematical careers,
- and to recognize extraordinary achievements and advances in mathematical research.

CMI aims to further the beauty, power and universality of mathematical thought.