Welcome to Beijing for ICM-2002

The first International Congress of Mathematicians (ICM) in the new millennium will be held in Beijing, China, in August 2002. Chinese mathematicians are overjoyed as they look forward to this special moment and to receiving guests and friends from all over the world.

Chinese mathematics has a long history. Since the beginning of the twentieth century, Chinese mathematicians have been working hard to catch up to the most advanced levels of mathematics. The modernization of mathematics in China has accelerated at an unprecedented rate in the past two decades. Now we are greatly encouraged by being able to host the ICM-2002. Chinese mathematicians, including those who live outside China, are eager to contribute not only to preparing a successful congress but also to making it a new start for the development of Chinese mathematics and for closer international cooperation.

The preparation of the congress has won wide social and governmental support. In particular, the president of the People's Republic of China, Jiang Zemin, expressed his enthusiasm clearly when in October 2000 he met with a group of mathematicians from China and abroad. He said that "the Chinese government supports the ICM-2002 in Beijing and wishes to take this opportunity to strive to advance mathematical research and education in China to the world frontiers in the early twenty-first century and to lay a solid foundation for the further progress of science and technology in China." At the meeting President Jiang accepted an invitation from J. Palis, president of the International Mathematical Union, to give the opening address at the congress.

The ICM-2002 Local Organizing Committee has obtained from the Chinese government partial funding for the congress. Efforts to raise the remaining funds through donations from industries and private individuals are under way. Observing the resolution of the International Council of Scientific Unions on the free circulation of scientists, the China Association for Science and Technology has provided assurances that all bona fide mathematicians and their companions who have registered for ICM-2002 will be able to obtain visas for entry into China.

As China is the first developing country to host an ICM, the Local Organizing Committee has made plans to provide as much financial support as possible to allow both young and senior mathematicians from developing countries and from Eastern Europe to attend the congress. Application forms have been distributed, and a special subcommittee has been appointed to review the applications.

Mathematical traditions in Beijing can be traced back to ancient times. In the development of mathematics in modern China, Beijing has played an increasingly important role. In the early 1930s a group of outstanding Chinese mathematicians, including Hua Luo-keng and Chern Shiing-Shen, were trained here and stepped onto the international stage of mathematics from here.

Today Beijing is one of China's main centers for mathematical research and education. Three leading universities (Peking University, Tsing Hua University, and Beijing Normal University) and four research institutes of the Academy of Mathematics and Systems Sciences of the Chinese Academy of Sciences (the Institute of Mathematics, the Institute of Applied Mathematics, the Institute of Systems Science, and the Institute of Computational Mathematics), as well as the Nankai Institute of Mathematics at Nankai University in the nearby city of Tianjin, conduct mathematics instruction on a broad front and carry out many state-of-the-art research projects in various fields. In recent years special attention has been paid to attracting and training excellent young mathematicians, and international exchanges have greatly increased. Every year we receive numerous visitors from all over the world.

Now Chinese mathematicians are looking forward to welcoming guests for ICM-2002! The conference site at the Beijing International Convention Center and the Great Hall of the People in Tiananmen Square, where the opening ceremonies will be held, have been reserved. Hotels of every category will be available during the congress.

In addition to the section and plenary lectures, the congress will feature some cultural events; one possibility is a performance by the Peking Opera. Beijing is an ancient yet modern city with a rich and precious cultural heritage. There is much to see and explore in Beijing.

In conjunction with the Beijing Congress about forty satellite meetings will be held in different parts of Asia and one as far afield as Moscow. Taking part in one or two such satellite meetings can enhance the academic benefits of attending ICM-2002 and also provide the chance to enjoy China and its neighboring countries, which are both beautiful and historical.

Please visit the website `http://www.icm2002.org.cn/`, which contains up-to-date information about the congress.

—Zhi-Ming Ma
President, Chinese Mathematical Society
Chairman, Local Organizing Committee of ICM-2002

Letters to the Editor

The Computer and Mathematics

J. R. D. North asks ["Letters", June/July 2001] for a demonstration by a computer that the harmonic series diverges.

His example illustrates the following principle: Suppose that one has a computer algorithm alleged to provide an approximation to some mathematical quantity. Then the algorithm should be accompanied by a theorem giving a measure of the distance between the output of the algorithm and the mathematical quantity being approximated. For the harmonic series, one would soon find that the sum was infinite.

In 1973 Mike Waterman and I developed such a theorem for a calculation of Euler's constant [*Math. Comp.* **28** (1974), 599–604]. Our scheme failed because the computer made an undetected electronic error despite many built-in error-detection methods. The error was discovered a year later by the Australian mathematician Richard P. Brent, whose first try at computing Euler's constant to 21014 decimals had also failed, apparently because of a machine error [*Math. Comp.* **31** (1977), 771–777].

—*W. A. Beyer*
Los Alamos National Laboratory

(Received August 1, 2001)

The Continuum Hypothesis

While reading W. Hugh Woodin's articles "The Continuum Hypothesis" (Part I, June/July 2001; Part II, August 2001), I recalled the intuitive argument against the continuum hypothesis given by Chris Freiling [Axioms of symmetry: Throwing darts at the real number line, *J. Symbolic Logic* **51** (1986), 190–200]. Let $\mathbb{R}_{\aleph_0}$ be the set of all countable subsets of $\mathbb{R}$. Freiling considered the statement $A_{\aleph_0}$: for every function $f : \mathbb{R} \to \mathbb{R}_{\aleph_0}$ there are $x, y \in \mathbb{R}$ such that $x \notin f(y)$ and $y \notin f(x)$. He proved that $A_{\aleph_0}$ is equivalent to the negation of the continuum hypothesis and argued that $A_{\aleph_0}$ is intuitively true. His argument was that given f, the desired x and y can be found by random choices. Then, since $f(y)$ is countable, $x \notin f(y)$ with probability 1 and, by symmetry, $y \notin f(x)$ with probability 1.

I found Freiling's argument very convincing (after all, as Freiling put it, if by some very strange miracle, say, $x \in f(y)$, we can always make another random choice of x and y) until I considered a similar statement concerning the set $\mathbb{N}$ of natural numbers. Let $\mathbb{N}_{\text{finite}}$ be the set of all finite subsets of $\mathbb{N}$. Consider the statement A_{finite}: for every function $f : \mathbb{N} \to \mathbb{N}_{\text{finite}}$, there are $x, y \in \mathbb{N}$ such that $x \notin f(y)$ and $y \notin f(x)$. Since for any finite subset $F \subset \mathbb{N}$ and any randomly chosen $x \in \mathbb{N}$, $x \notin F$ with probability 1, we can use exactly the same reasoning Freiling used about $A_{\aleph_0}$ to argue that A_{finite} is intuitively true. However, A_{finite} is false: consider $f : \mathbb{N} \to \mathbb{N}_{\text{finite}}$ defined by $f(x) = \{1, 2, \ldots, x\}$.

After reading Woodin's articles, I believe that the continuum hypothesis may be resolved by methods of modern set theory, but I think it is unlikely that it will be settled, one way or the other, by a simple intuitive argument.

—*Janusz Konieczny*
Mary Washington College

(Received August 10, 2001)

Online Tutorials

Mathematics students increasingly have access to online sources of tutorial assistance, whether from textbook publishers, educational institutions, or independent companies. Having recently been involved in a beta test of a new online tutorial site for calculus and precalculus (`http://www.hotmath.com/`), I am wondering about the impact of these resources on student learning. Hotmath suggests on its site that the benefits of their tutorial homework assistance outweigh the risks of abuse by students. I am very curious to know if this is true in practice.

As a full-time faculty member at American River College (Sacramento, CA) and a mathematics education graduate student at the University of California at Davis, I would welcome information from my teaching colleagues on any observations they might have made concerning how students use online tutorial sites; which ones they use; and what effect, for good or ill, the sites appear to have. Surely this is an area meriting further investigation.

I can be contacted at `abarcellos@ucdavis.edu`. Thank you.

—*Anthony Barcellos*
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Refereeing

To improve the quality of refereeing in mathematics journals at least partially [see "Letters to the Editor", Sept. 2001 issue], a reviewer recommending the acceptance of an article might be invited by the editor to forego his anonymity and have his name displayed prominently on the title page. Such visibility may lend more respect to the task of the reviewer and may serve as a reward for the reviewer's efforts.

—*Agnes P. Berger*
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Fellows of the AMS

In the August 2001 "Opinion" column Andy Magid proposes that the AMS create a "special class of distinguished members identified as 'Fellows of the American Mathematical Society'," and he points out that many sciences have set up institutions of this sort. Earlier in the article he writes that some department heads "believed that many university honors that could justifiably have gone to mathematics went instead to faculty in other disciplinary units simply because those disciplines have many more prizes than does mathematics." The fellows idea was then presented as a possible alternative to creating more prizes.

I would like to argue that this is not such a good idea, not because such institutions are ineffective. They are in fact extremely effective, but in

an undesirable way. I believe that such an institution would do little to affect the progress of mathematics, but I'm quite certain that it would have a very considerable effect on the careers of individual mathematicians, both those who were elected to fellowships and those who were not. It seems obvious, for instance, that whether a person was a fellow or not would have a substantial effect on his/her likelihood of obtaining funding for research. Further, whether we intend it or not, being a fellow would be a sort of certification and would play a major role in how the individual was advanced, just as the various university degrees qualify candidates for jobs at different levels.

Prizes are another matter because they are awarded generally for an important piece of work (we all remember that Einstein got the Nobel Prize for the photo-electric effect), and perhaps there should be more of them as significant new areas of mathematics emerge. But the emphasis should be on the mathematical achievement, and only secondarily on the person who achieved it.

To say it once more, I am convinced from my own experience that self-appointed, self-perpetuating, elitist groups like the one being proposed do more harm than good. Inevitably much energy is spent trying to get into the group or getting one's friends or colleagues in. Moreover, a person's professional advancement becomes much more dependent on "who you know" rather than what you've done. For all of these reasons I hope the AMS membership will avoid getting into this kind of a tangle.

—David Gale
University of California at Berkeley

(Received August 28, 2001)

Human Rights and the ICM

The upcoming International Congress of Mathematicians (ICM) in Beijing next summer has many mathematicians worried about the woeful human rights record of the Chinese government (see below and article by Allyn Jackson in the September 2001 issue of the *Notices*). They are concerned that by sticking to "mathematics as usual", willingly or not, they may be seen by their Chinese colleagues and others as effectively endorsing these oppressive practices by their host government. This is undoubtedly the way in which the government news media will present it to the Chinese public. Images on state television of three or four thousand distinguished international professionals applauding the officials welcoming the congress could be interpreted by their Chinese viewers as such an endorsement.

It seems to us that this puts an extra responsibility on the officials of the IMU (International Mathematical Union), the organizers of the meeting, to take account in a public way of the fate of imprisoned and harassed colleagues, academics, students, medical professionals, and other pro-democracy advocates.

There are many ways of doing this while still being appreciative of the accomplishments of this great ancient civilization, supportive of the legitimate aspirations of the Chinese people, and appreciative of the important progress made by China in recent years, including its strong support of mathematics. One such way is to schedule a session on Human Rights and Social Responsibilities of Scientists where such issues, which are not confined by any means to China, could be discussed in a global context. Such sessions have been held at many conferences, including at least one in China, without in any way diminishing the scientific program. There was also at the 1998 ICM in Berlin a program about the black period in Germany (1933–1945).

In addition to or independent of such a session, individual speakers could put up transparencies at the beginning or end of their lectures expressing (in a nonconfrontational way) their concerns about the human rights of, and solidarity with, oppressed scientists. This has been done by many speakers at scientific conferences since the 1970s when human rights of colleagues in the former USSR, Latin America (particularly José Luis Massera in Uruguay), and other places became an issue for many scientists.

Information about human rights of scientists in China and elsewhere is available at `http://math.rutgers.edu/~lebowitz/`. One can also find there an old booklet (currently being revised) describing actions which participants in scientific conferences in China may wish to take.

The undersigned is chair of the AMS Committee on Human Rights of Mathematicians, and this letter has also been endorsed by the following members of that committee: F. Bonahon, P.-S. Hsu, T.-Y. Lam, L. Nirenberg, Ya. G. Sinai, S. G. Staples, M. M. Tom, and D. A. Vogan. Our letter represents the personal opinions of these individuals; we are not speaking officially for the AMS.

—J. L. Lebowitz
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