Notices

of the American Mathematical Society

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From the President of the AMS

Mathematical Challenges of the 21st Century

On August 6–12, 2000, the American Mathematical Society will hold an extraordinary meeting on the UCLA campus under the title "Mathematical Challenges of the 21st Century". As the principal organizer of this meeting, I feel compelled to tell the members of the AMS about the purposes of this meeting and the principles on which it has been organized. (For a detailed listing of the 31 plenary speakers and their topics, see the "Meetings" section of the present issue of the *Notices* or the Web site `http://www.ams.org/meetings/`; for a discursive description of the meeting, see Allyn Jackson's article "Stellar Lineup for UCLA Meeting" in the February 2000 *Notices*.)

The purposes of the meeting are twofold:

1. To exhibit the vitality of mathematical research and to indicate some of its potential major growing points: these include some of the major classical problems (the Riemann Hypothesis, the Poincaré Conjecture, the regularity of three-dimensional fluid flows) as well as some of the recently developed major research programs like those associated with the names of Langlands and Thurston.

2. To point up the growing connections between the frontiers of research in the mathematical sciences and cutting-edge developments in such areas as physics, biology, computational science, computer science, and finance.

The meeting will aim to raise consciousness within the mathematical community itself, the scientific community more generally, and beyond these (one hopes) policy and opinion makers and society at large.

We hope to raise awareness of the amazing growth in the past several decades of interactions between sophisticated mathematical research and major problems arising in science and society. As I write these lines, I have just been looking at a note in the *Proceedings of the National Academy of Sciences* that describes the application of contemporary knot theory to the function and structure of DNA. The other day I wrote down a list of such topics, many of which might be covered in our meeting. I found the following eighteen (the reader is invited to add to this list):

1. Wavelet theory and harmonic analysis in data compression and statistical inference
2. Knot theory in quantum physics and molecular biology
3. Stochastic analysis and mathematics of finance
4. Dynamical systems, chaos theory, and fractals
5. Mathematical models of pattern perception
6. Complex systems in biology
7. Quantum computing and quantum information theory
8. Mathematical probes of reliability in computational science
9. Algebraic methods in combinatorial problems
10. Quantum field theory and string theory in relation to geometry
11. Noncommutative geometry and models of space and time
12. Mathematical analysis of algorithms
13. Computational molecular biology
14. Mathematical models of turbulence
15. Nonlinear partial differential equations of general relativity theory
16. Calculus of variations and nonlinear PDEs in materials science
17. Prime number theory and cryptology
18. Algebraic number theory in coding theory

The program for "Mathematical Challenges" reflects the way in which mathematics is reaching out to other disciplines, solving problems, and opening new pathways for research, while at the same time drawing in ideas that bring new vitality and richness to the field. The speakers have been asked to give a broad picture of the prospects and challenges in the areas they cover and to do so in terms that are comprehensible to a general mathematical audience. This will be an important event, and I urge and welcome you to attend.

—Felix E. Browder