2006 JPBM Communications Award

The 2006 JPBM Communications Award was presented at the Joint Mathematics Meetings in San Antonio in January 2006.

The Joint Policy Board for Mathematics (JPBM) established its Communications Award in 1988 to reward and encourage journalists and mathematicians who, on a sustained basis, bring mathematical ideas and information to nonmathematical audiences. Presented annually, the award recognizes a significant contribution or accumulated contributions to the public understanding of mathematics, and it is meant to reward lifetime achievement. The award carries a cash prize of US$1,000. The JPBM represents the American Mathematical Society, the American Statistical Association, the Mathematical Association of America, and the Society for Industrial and Applied Mathematics.

Previous recipients of the JPBM Communications Award are: James Gleick (1988), Hugh Whitemore (1990), Ivars Peterson (1991), Joel Schneider (1993), Martin Gardner (1994), Gina Kolata (1996), Philip J. Davis (1997), Constance Reid (1998), Ian Stewart (1999), John Lynch and Simon Singh (special award, 1999), Sylvia Nasar (2000), Keith J. Devlin (2001), Claire and Helaman Ferguson (2002), Robert Osserman (2003), and Barry Cipra (2005).

The selection committee for the 2006 award consisted of: James Arthur, Carl Cowen, Martin Golubitsky, and Elizabeth Halloran.

The 2006 JPBM Communications Award was presented to SIR ROGER PENROSE. What follows is the award citation, a brief biographical sketch, and the recipient's response to the award.

Citation

The Joint Policy Board for Mathematics presents its 2006 Communications Award to Sir Roger Penrose for the discovery of Penrose tilings, which have captured the public's imagination, and for an extraordinary series of books that brought the subject of consciousness to the public in mathematical terms.

Sir Roger Penrose

Dr. Penrose has acquired a large public following for eight books he has written. A number of these explore ideas that relate fundamental physics, mathematical logic, and human consciousness. In *The Emperor's New Mind* (1989) and also in later volumes, he has argued that known laws of physics do not constitute a complete system and that human consciousness cannot be explained until a new physical theory of quantum gravity has been devised. These ideas have stimulated broad public debate. They have brought widespread attention to the scientific and philosophical implications of consciousness. The most recent book of Dr. Penrose, *The Road to Reality* (2005), is a bold and broadly conceived attempt to present the techniques of modern mathematics and physics before a general public audience. This year's JPBM Communication Award is a tribute to the way that Dr. Penrose has made the ideas behind high level mathematics accessible to large segments of the general public.

Biographical Sketch

As a graduate student, Roger Penrose studied mathematics and physics at Cambridge University from the likes of Bondi, Dirac, Hodge, Steen, and Todd. He was awarded his Ph.D. there in algebraic geometry in 1958. After positions at various universities in both England and the United States, he was appointed the Rouse Ball Professor of Mathematics at the University of Oxford in 1973, a position he held until 1998, when he became Emeritus Rouse Ball Professor of Mathematics.

In his research career Penrose has made fundamental and remarkably diverse contributions to both mathematics and physics. Many of these concern the interplay between relativity, geometry, and topology, and are related to the attempt to unify relativity with quantum theory. In 1967, Penrose discovered twistor theory, a beautiful mathematical formalism that combines powerful techniques of algebra and geometry. In 1971, he introduced the theory of spin networks, which later became a part of the geometry of spacetime in loop quantum gravity. In 1974, he discovered what are now known as Penrose tilings, which are formed from two tiles that can only tile the plane aperiodically. Such patterns were later found, quite remarkably, to occur in the arrangement of atoms into quasicrystals.

Penrose has received many awards and honors. He was elected to fellowship in the Royal Society of London (1972) and as a foreign associate of the National Academy of Sciences (1998). He received the Wolf Foundation Prize in Physics (with Stephen Hawking, 1988) and the DeMorgan Medal of the London Mathematical Society (2004). In 1994, he was knighted for his service to science.

Response

It is a deep and unexpected honour, and a great pleasure for me, to receive the JPBM Communications Award for 2006.

I certainly believe in the importance of conveying to the general public, as far as this is possible, something of the real nature of mathematics, not only for its increasing utility across so many areas of importance to modern society, but also for its beauty and for the inner satisfaction that it brings. Perhaps these latter qualities are even more important than the more utilitarian ones; for one cannot really properly understand mathematics without having some kind of appreciation of its aesthetic qualities. Moreover it is a belief (or a faith?) of mine that there are many more out there, among those who claim no appreciation or understanding of mathematics, who actually have within themselves some genuine but unrecognized abilities in this direction.

And it is certainly not just the general public who can stand to gain from clear expositions of mathematical topics. Science in general, and mathematics in particular, have grown to enormous proportions over the years, and over the centuries. Semi-popular expositions which give clear and intuitive accounts of one area of work can be an invaluable aid to others whose expertise may lie in some area of science or mathematics which is far from that being explained. In my own experience, such accounts can have enormous value.

If, as this award seems to imply, I have contributed, in some significant way, to the spreading of scientific or mathematical knowledge and understanding, then I am indeed well pleased. Thank you very much.