

Grant Opportunity Announcement

Foundational Questions in the Mathematical Sciences

Program Co-chairs: Harvey Friedman & S. Barry Cooper

Deadline for Inquiry: April 15, 2010

Mathematics is considered the language of nature and provides the basis for modern scientific discovery. It has been integral to research in the physical sciences, engineering, and information technology. Mathematical modeling and meta-mathematical explorations are also transforming research in many areas of human knowledge. The program “Foundational Questions in the Mathematical Sciences” focuses on two large issues related to the fundamental role of mathematics.

The first issue concerns the possible limits of mathematical methods, not only within mathematics itself, but in applications to areas of mathematical science such as probability, statistics, physical science, economics, and computer science. For instance, Gödel’s Incompleteness Theorems have been a source for a variety of views concerning the fundamental role of mathematics in human knowledge: Freeman Dyson views them as guarantees that there will always be new things to discover. Roger Penrose claims that they defeat the goals of artificial intelligence and demonstrate that the human mind can never be emulated by a Turing machine.

The second, related, issue concerns the promise and limits of artificial intelligence (AI). Three decades ago, there was great optimism about the future of AI. The expectation of rapid development of super-human artificial intelligence generated considerable philosophical investigations. However, these great expectations have not been realized yet, and AI largely faded from public view. The field encountered new issues and discovered that even the older problems were much more difficult than expected.

In order to deepen our understanding of these issues, the John Templeton Foundation invites research proposals that are directly or indirectly related to one of the following Big Questions:

- (1) What are the limits of mathematics in advancing human knowledge?
- (2) What have the difficulties of AI taught us about the nature of mind and intelligence?

Budget range and term for individual projects: From \$50,000 to \$400,000 and for up to two years. Researchers in all areas of the mathematical sciences, logic, philosophy, computer science, and related fields are eligible to apply.

For more information about the grant program, please visit:

[http://www.templeton.org/what we fund/2010 funding priorities/foundational questions in the mathematical sciences/](http://www.templeton.org/what_we_fund/2010_funding_priorities/foundational_questions_in_the_mathematical_sciences/)