



**An International Science Essay Competition
On the Nature of our Universe and its Habitats**

Open to High School and College Students

Projected Timeline for Key Program Activities

February 2012

Release of the formal Request for Essays

June 15, 2012

Deadline for submitting essays

September 2012

Winners notified

October 12-13, 2012

Award ceremony, Philadelphia, PA, USA

Overview

The *New Cosmic Frontiers Essay Contest* is a global science essay competition organized as part of the larger *New Frontiers in Astronomy and Cosmology* program, which aims to advance our understandings in the most fundamental areas in astronomy and cosmology that engage Big Questions. The Essay Contest is being offered for high school and college students globally. The Essay Contest will focus particularly on the following two Big Questions: “Are we alone in the universe? Or, are there other life and intelligence beyond the solar system?” for high school-level students; and “What is the origin of the complexity in the universe?” for college-level students.

The *New Cosmic Frontiers Essay Contest* aims to advance the extraordinary vision of Sir John Templeton on the special occasion of the centenary of his birth and to inspire students to pursue scientific knowledge and become the original, forward-looking Big Question thinkers of tomorrow.

Winners will be awarded significant monetary prizes to support their scientific research pursuit and be given an extraordinary opportunity to meet today’s world-renowned scientists and scholars.

Purpose

The purpose of the essay contest is to inspire young students to consider careers in science and to nurture their enthusiasm for the subject. The contest is designed to engage young minds in intellectual as well as creative activities essential in scientific endeavors. In addition, by providing them with the opportunity to meet and interact with today’s leading forward-looking thinkers/scholars, we hope to have enduring impacts on these young students to seek their own potential to become the original and forward-looking Big Question thinkers of tomorrow.

The contest will address two of *the Big Questions* we face today in cosmology and astronomy. We seek submissions from exceptionally talented, scientifically minded students. There are two categories for submission, with 8 winners in each category. All who are in contact with such students are encouraged to inform them of this extraordinary opportunity and event.

⌘ Eligibility

Category 1: High School Students or Equivalent

- The Category 1 essay contest is open to any high school (or equivalent in their local system) student from 13 to 18 years of age at the time of essay submission. College and university students, regardless of age, must submit in Category 2.

Category 2: College Students

- The Category 2 essay contest is open to any student currently enrolled as an undergraduate at a college or university at the time of submission. Generally this will mean the student is 22 years of age or under. (Regardless of age, those who are college or university students must submit their essays in Category 2.)

⌘ Prizes

The top three essays in each category will be awarded significant prizes recognizing excellence, originality and creativity. The winners are encouraged to use the prize money for the purpose of furthering their career in science.

Category 1: High School Students or Equivalent

- First Prize – The top essay will be chosen for a \$25,000 cash prize.
- Second Prizes – The next two essays will be chosen for a \$10,000 cash prize each.
- Third Prizes – The next five essays will be chosen for a \$5,000 cash prize each.

Category 2: College Students

- First Prize – The top essay will be chosen for a \$50,000 cash prize.
- Second Prizes – The next two essays will be chosen for a \$25,000 cash prize each.
- Third Prizes – The next five essays will be chosen for a \$10,000 cash prize each.

In addition, up to 10 honorable mentions of \$3,000 each will be awarded in either category.

⌘ Timeline

June 15, 2012: Deadline for essay submission (Both categories 1 and 2)

September 2012: Notification to the winners and honorable mentions

October 12 & 13, 2012: Award Ceremony in Philadelphia

Guidelines

General (apply to both categories):

- Only one submission per entrant is allowed.
- Essays must be written in English.
- Essays submitted must be entrants' own original work; however, seeking advice from their teachers/professors is permitted in order to improve their scientific validity and rigor.
- Essays must include a bibliography of the source material, not to be included in the word count.
- Applications must include certification from a parent/guardian and an instructor (or teacher or mentor) verifying the student's age, enrollment status, academic standing, and originality of the work submitted.
- Winning essays, including those of honorable mentions, may be published on the program website as well as in a prominent magazine.
- Winners will be invited to the award ceremony in Philadelphia as described below.
- Applicants may be asked to complete a voluntary survey about their experience with the contest and its potential impacts approximately one year after the contest.

Category 1: Essay Theme for High School Students

- Essays must be 2000 to 3500 words in length
- Essays must address the Big Question:

***Are we alone in the universe?
Or, are there other life and intelligence beyond the solar system?***

The recent, rapid advances in technologies that allow the detection of exo-planets in the “life zone” and potential signatures of life and intelligence in the universe raise hope that we are getting very close to the stage to be able to answer the age old question: “Are we alone in the universe?” Discovering life and intelligent beings outside our solar system will be among the greatest scientific discoveries of all time.

Students are encouraged to choose some aspects of this question, from which they may generate more focused essays. The following sub-questions are provided as exemplary questions. Applicants may choose their own research questions provided that such questions are *directly* or *significantly* relevant to the above Big Question.

Exemplary sub-questions:

- (1) What are the signatures of the existence of life and intelligence in the universe? How may we detect them?
- (2) Would the fine-tunings required for life in the universe also necessarily require that life be rare?
- (3) To what degree are such other beings likely to be similar to humans? Are there features in nature which could limit the level of intelligence or the differences we may expect?

- (4) How important is it for mankind to answer this Big Question and why?
- (5) What will the implications be of the answer “yes” or “no” to this Big Question?
- (6) Does our universe have features that limit the level of intelligence and/or the differences we may expect from them? What kinds of behaviour might we expect from them, if we ever meet them? Should we expect that they have learned how best to live with other beings as they must have survived their own conflicts long enough? What are the possibilities?
- (7) Are there advanced intelligent beings out there in the universe that are not biological or are beyond biological (post-biological)? If so, what would be the signatures of the existence of such intelligence?

Entrants may consider the following suggested readings for inspiration:

- ◆ *“Life in Space: Astrobiology for Everyone”*
By Lucas John Mix
- ◆ *“Strange New Worlds: The Search for Alien Planets and Life Beyond Our Solar System”*
By Ray Jayawardhana
- ◆ *“Are We Alone?: Philosophical Implications of the Discovery of Extraterrestrial Life”*
By Paul Davies
- ◆ *“Intelligent Life in the Universe: Principles and Requirements behind Its Emergence”*
By Peter Ulmschneider

Category 2: Essay Theme for College Students

- Essays must be 3500 to 5000 words in length.
- Essays submitted must address the Big Question:

What is the origin of complexity in the universe?

We are living in a wonderfully complex world. According to the known astronomical and cosmological theories, our universe has become more and more “complex” and produced more and more interesting phenomena in it. How did this happen? What were the key stages? What are the prerequisites for such emergent complexity? For instance, is the “Past Hypothesis” (the idea that the universe had the initial low entropy state) true? Through the process of becoming more and more complex, the universe generated conscious observers who contemplate the very meaning of existence of the universe as well as their own and ask the question: “Why are we here?” What are the origins of this amazing complexity in the universe? What are the origins and conditions of *continuing* complexity in the universe?

Students are encouraged to choose some aspects of this question, from which they may generate more focused essays. The following sub-questions are provided as exemplary questions. Applicants may choose their own research questions provided that such questions are *directly* or *significantly* relevant to the above Big Question.

Exemplary sub-questions:

- (1) What are the conditions for the universe to evolve to a high degree of complexity?

- (2) What are the key stages of increasing complexity in the universe? How do they come about?
- (3) Will the complexity of the universe continue to increase? If so, how long?
- (4) Or, are there any theoretical limits to the complexity of the universe?

Entrants may consider the following suggested readings for inspiration:

- ◆ *“Complexity: The Emerging Science at the Edge of Order and Chaos”*
By M. Mitchell Waldrop
- ◆ *“Just Six Numbers: The Deep Forces that Shape the Universe”*
By Martin Rees
- ◆ *“At Home in the Universe: The Search for the Laws of Self-Organization and Complexity”*
By Stuart Kauffman
- ◆ *“The Anthropic Cosmological Principle”*
By John Barrow & Frank Tipler
- ◆ *“Intelligent Life in the Universe: Principles and Requirements behind Its Emergence”*
By Peter Ulmschneider

Criteria of Merit

For this contest, we expect submissions to be of high quality. All qualified submitted essays will be judged based on the following criteria.

Category 1:

- **Originality:** The essay must be written in the entrant's own voice with his/her own idea. The originality of the chosen theme will be considered.
- **Creativity:** We seek creativity in the way the question is considered by the entrant.
- **Effectiveness:** The effective argument for the hypothesis and the theme presented in the essay will be considered.
- **Depth/Breadth:** As we seek young talents in science, we expect, at a minimum, the depth and breadth of knowledge appropriate for high school level students.

Category 2:

- **Originality:** The essay must be written in the entrant's own voice with his/her own idea. The originality of the chosen theme will be considered.
- **Creativity:** We seek creativity in the way the question is considered by the entrant.
- **Effectiveness:** The effective argument for the hypothesis and the theme presented in the essay will be considered.
- **Depth / Breadth:** As we seek young talents in science, we expect, at a minimum, the depth and breadth of knowledge appropriate for college level students.
- **Scientific Rigor:** We expect submissions in this category to be scientifically rigorous at the level appropriate for college students.

Selection of Winners

- The winners will be selected through the process set by the selection committee comprised of 5 to 7 members of the world's leading scientists and journalists.
- Finalists will be interviewed by an individual or group designated by the selection committee before final decisions are made.
- The selection committee reserves the right not to award prizes in any and all categories should it deem that submissions do not meet the contest criteria. All decisions of the selection committee shall be considered final.

☞ Award Ceremony

- All essay contest winners including honorable mention recipients will be invited to Philadelphia, Pennsylvania, USA and honored at a two-day program, October 12 and 13, 2012.
- The first prize essay winners in Category 1 and 2 will be invited to present their essays.
- The program will include presentations by research award winners of the *New Frontiers in Astronomy and Cosmology* grants program of their award winning proposals; a banquet; a noted scientific original thinker presenting a public event lecture related to the Big Questions; and a panel of Templeton Prize winners and other original thinkers, discussing the future of the Big Questions.

☞ THE HONORARY ADVISORS

The Honorary Advisory Board has been established, separately from the selection committee. The Honorary Advisors to this program are the following eight Templeton Prize laureates whose expertise and interests are closely related to the program themes, listed below with year of the prize awarded.

John D. Barrow, 2006	Professor of Mathematical Sciences, University of Cambridge;
Paul Davies, 1995	Professor of Physics, Arizona State University;
Freeman Dyson, 2000	Professor Emeritus of Particle Physics, Institute for Advanced Study;
George Ellis, 2004	Professor Emeritus of Applied Mathematics, University of Cape Town;
Michael Heller, 2008	Professor of Philosophy, Pontifical Academy of Sciences, Copernicus Center for Interdisciplinary Studies, Krakow, Poland;
John Polkinghorne, 2002	Fellow and former President of Queens' College, University of Cambridge;
Martin Rees, 2011	Astronomer Royal;
Charles Townes, 2005	Emeritus Professor of Physics, University of California, Berkeley.

Essays should be submitted using the online templates available on the www.NewFrontiersinAstronomy.org website.

Attention: Donald G. York, New Frontiers Principal Investigator, The University of Chicago
E-mail: bigquestions@oddjob.uchicago.edu

Questions and inquiries regarding this RFP may be e-mailed to: bigquestions@oddjob.uchicago.edu.
No telephone inquiries will be accepted by the program.