

2018 Bertrand Russell Prize

CHRISTIANE ROUSSEAU was awarded the inaugural Bertrand Russell Prize of the AMS at the 124th Annual Meeting of the AMS in San Diego, California, in January 2018.



Christiane Rousseau

Citation

The 2018 Bertrand Russell Prize of the American Mathematical Society is awarded to Christiane Rousseau in recognition of her many contributions furthering human values and the common good through mathematics. Throughout her career, Professor Rousseau has inspired people of all ages and diverse backgrounds through her lectures, publications, and a wide range of

activities reaching out to the general public. In particular, through her visionary leadership of the thematic year *Mathematics of Planet Earth 2013* and her continuing active involvement in the ongoing activities that grew from it, Professor Rousseau has created opportunities for the mathematics community worldwide to confront crucial challenges facing our planet while highlighting the contributions of mathematicians to the well-being of society.

Christiane Rousseau earned her doctorate from the Université de Montréal in 1977, to which she returned as a faculty member in 1979, after a postdoctoral position. She has remained at Montréal since, including a period as department head. Her research falls primarily within dynamical systems and differential equations, areas in which she has published nearly 100 papers and supervised about ten PhD students. Rousseau served as president of the Canadian Mathematical Society from 2002 to 2004. She has been a delegate to the General Assembly of the International Mathematical Union on three occasions and served as vice president of the IMU from 2011 to 2014. She remains on the IMU Executive Committee. Throughout all this, Rousseau has been steadfastly dedicated to mathematical outreach at all levels. She has published many articles in popular science magazines. She regularly lectures in schools and vocational colleges. For decades she has organized and participated in mathematics camps of the Association Mathématiques du Québec. For the last decade she has organized the public lecture series of the Centre de Recherche Mathématiques (CRM), and she regularly gives public lectures herself at other venues. In 2008

she coauthored a textbook, *Mathematics and Technology*, which remains in widespread use and has been translated into several languages.

In the early part of this decade Rousseau conceived of the idea of *Mathematics of Planet Earth 2013* (MPE 2013), a year-long international program aimed at both the mathematics community and the general public, with the goal of identifying fundamental mathematical problems that contribute to the understanding and sustainability of our planet and, at the same time, of informing the public about the role of mathematics in addressing these challenges. Professor Rousseau proved indefatigable and highly skilled as an advocate and organizer of MPE 2013. She personally secured patronage of MPE 2013 from UNESCO, which hosted an MPE 2013 day at its Paris headquarters. The Simons Foundation supported a high-level public lecture series for MPE 2013, which was delivered around the globe. Over the course of the year the program's activities grew to involve many researchers worldwide and over 140 scientific societies, universities, research institutes, and foundations. Over fifteen major programs and sixty workshops were held at math institutes, and there were dozens of special sessions at conferences, public lectures, special schools for graduate students, and research experiences for undergraduates. Museum-quality exhibits and high-quality curriculum materials for all levels were produced and remain in use. Rousseau herself wrote an article on the discovery of the inner core of the earth for an MPE-themed special issue of the *College Mathematics Journal*, which received the MAA's Pólya Prize the next year.

Another indication of the success of MPE 2013 is that it did not disappear at the end of the calendar year but instead transitioned to an ongoing MPE activity. A series of educational workshops and a research network on mathematics and climate have been funded by the US National Science Foundation. A multi-institutional MPE Centre for Doctoral Training has been established with support of the British Engineering and Physical Sciences Research Council. Other MPE working groups and projects have been established around the world. SIAM has started SIAG/MPE, an activity group in the area. Through another initiative of Professor Rousseau's, there have been two juried international competitions for exhibits on the themes of

MPE, resulting in a permanent exhibition curated by IMAGINARY, a project of the Oberwolfach institute, and made available to museums and schools worldwide. Through her commitment, dedication, energy, and ability, Professor Rousseau has mobilized mathematicians to take on world challenges, advancing the discipline and making her a most appropriate recipient of the first Bertrand Russell Prize of the AMS.

Biographical Sketch

Christiane Rousseau got her PhD from the Université de Montréal in 1977. After a postdoc at McGill University, she became professor in the Department of Mathematics and Statistics of the Université de Montréal. Her research field is dynamical systems. She chaired her department from 1993 to 1997. Christiane Rousseau was vice president of the Canadian Mathematical Society for 1995–1997 and then president for 2002–2004. She chaired the Canadian National Committee for 2004–2008 and led two Canadian bids for the International Congress of Mathematicians, ICM 2010 and 2014. Christiane Rousseau was vice president of the International Mathematical Union (IMU) for 2011–2014, and she is a member of the executive committee of the IMU for 2015–2018. She was interim director of CRM for the year 2008–2009. During that period, she started *Mathematics of Planet Earth 2013* (MPE 2013) with thirteen North American institutes in mathematical sciences. MPE 2013 grew to the size of an international year under the patronage of UNESCO. For 2015–2017, she is a member of the Scientific Board of the International Basic Sciences Program of UNESCO. Since 2013, she has been a Fellow of the AMS, and she was the recipient of the George Pólya Award in 2014. Christiane Rousseau is very involved in outreach activities, including the magazine *Accromath*, the organization of public lectures, the organization of math camps, and the training of preservice high school teachers.

Response from Christiane Rousseau

I feel extremely privileged to receive the 2018 Bertrand Russell Prize of the AMS. And I am very thankful to the AMS for this honor. The success of *Mathematics of Planet Earth* (MPE) came from teamwork, and I am very grateful to my American colleagues, in particular Brian Conrey, Hans Kaper, and Mary Lou Zeeman, for their commitment to the success of MPE 2013 and to the move to MPE at the end of the year. As soon as I had the idea of *Mathematics of Planet Earth*, it became a passion for me to learn more about the many contributions of mathematics to the understanding of our planet. At the same time, the more I learnt about the threats coming from global changes and the increase of the world population, the more I felt that our community has to play a role. Indeed, mathematics has so much to say on these challenges that it is a must to train a new generation of researchers who can contribute to [solving] these problems; this is why MPE spread by itself over the world. And one does not need to be an applied mathematician to convey the message through one's teaching or outreach activities. MPE has made the case that, by joining forces internationally, we can have

an impact. The work is just starting. A scientific consensus has grown on global changes and has led to the Paris climate agreement of December 2015. But that agreement is now in danger, and many countries do not respect their commitments. We must continue the work with our colleagues from other scientific disciplines.

About the Prize

The Bertrand Russell Prize is awarded by the AMS Council acting on the recommendation of a selection committee. The members of the committee to select the winner of the Bertrand Russell Prize for 2018 were:

- Douglas A. Arnold (Chair)
- Inez Fung
- Charles Samuel Peskin

The Bertrand Russell Prize was established in 2016 by Thomas Hales. The prize looks beyond the confines of the profession to research or service contributions of mathematicians or related professionals to promoting good in the world. It recognizes the various ways that mathematics furthers fundamental human values. Mathematical contributions that further world health, our understanding of climate change, digital privacy, or education in developing countries are some examples of the type of work that might be considered for the prize.

Photo Credit

Photo of Christiane Rousseau courtesy of Christiane Rousseau.

