

BIOSKETCH

[PIERRE L'ECUYER](#) has been a professor in the Département d'Informatique et de Recherche Opérationnelle at the Université de Montréal since 1990. Prior to that, he was a professor in the Département d'Informatique at Université Laval from 1983 to 1990. He held a prestigious Canada Research Chair in Stochastic Simulation and Optimization for 2004–2017 and was an INRIA International Chair (at Inria-Rennes, France) during the period 2013–2018.

He completed his BS degree in 1972, his MS in operations research in 1980, and his PhD in computer science in 1983, all at Université de Montréal. His Ph.D. thesis and earliest work was on Markov decision processes and approximate stochastic dynamic programming in infinite state spaces, where he contributed new theory and developed applications in economics, maintenance and reliability, production, computer systems, and computational finance.

Professor L'Ecuyer is recognized as a world authority on the design, theoretical analysis, implementation and statistical testing of random number generators (RNGs) for simulation. He has developed statistically reliable and efficient RNGs, supported by mathematical analyses of the uniformity and independence of their output values. He is also known for his work on algorithms that can provide multiple streams and substreams of random numbers in unlimited numbers. His mathematical analysis unveiled significant defects in several RNGs available in software. Professor L'Ecuyer's TestU01 library is now viewed as the gold standard for statistical testing of random number generators for both simulation and cryptography.

In addition, he has made several fundamental contributions to the area of randomized quasi-Monte Carlo (RQMC) methods. These algorithms replace vectors of independent random numbers by more evenly distributed points. He has studied construction methods, proposed and compared selection criteria for the parameters, built software that constructs point sets based on these criteria, and showed how these methods can improve simulation efficiency. He has also studied applications of these ideas in finance, risk analysis, and stochastic networks. He also is known for Array-RQMC, an effective RQMC method for the simulation of Markov chains over a large number of steps, and he has shown that this method can bring large variance reductions for applications in finance and biology, for example.

Professor L'Ecuyer is also known for his important contributions to the development and analysis of efficient methods for estimation of derivatives (or gradients) and to the development of simulation-based optimization methods. Another significant area of contribution for which he is known is variance reduction, in which an estimator is replaced by a more cleverly designed one having the same expectation but smaller variance. Some of these methods use (and sometimes combine) ideas based on conditional Monte Carlo, importance sampling, and splitting to estimate rare event probabilities.

Finally, Professor L'Ecuyer has also made significant contributions to the stochastic modeling and optimization of complex service systems. In particular, he has developed useful statistical models in which the arrival rate of customers can be non-stationary and stochastic. The models he introduced are widely viewed as being more realistic than previously proposed such models. In addition, he has also developed optimization methods for the staffing and scheduling of agents in such systems.

He is a past Editor-in-Chief for ACM Transactions on Modeling and Computer Simulation, and has served as Area or Associate Editor for ACM Transactions on Mathematical Software, Management Science, Statistics and Computing, and International Transactions in Operational

Research. His influence on the field has also been felt through his supervision and guidance of 23 postdoctoral fellows and 54 Ph.D. and master students.

Professor L'Ecuyer's work has been recognized with multiple prestigious awards, including the INFORMS Simulation Society Lifetime Professional Achievement Award in 2020, the Computer Science Canada Lifetime Achievement Award in 2019, the ACM SIGSIM Distinguished Contributions Award in 2016, the Canadian Operational Research Society Award of Merit in 2014, and the INFORMS Simulation Society Distinguished Service Award in 2011. His research has been recognized with the INFORMS Simulation Society Outstanding Research Publication Award three times, in 1999, 2009, and 2018, a Killam Research Fellowship in 2001-03, the Urgel-Archambault Prize from ACFAS in 2002, and a Steacie Fellowship from NSERC-Canada in 1995-97. He was selected as an INFORMS Fellow in 2006.

He has been a visiting scholar at Stanford University (USA), INRIA–Rocquencourt (France), Ecole des Mines (France), Waseda University (Tokyo), University of Salzburg (Austria), North Carolina State University (USA), Universite de Savoie in Chambéry (France), University of New South Wales (Australia), several times at INRIA–Rennes (France), and Google Research (Mountain View, USA). He is currently a member of the CIRRELT and GERAD research centers in Montreal.

Given all of his achievements in simulation and operations research, it may come as a surprise that Professor L'Ecuyer has a second area of interest in which he is also recognized for his world class accomplishments. In particular, he is widely known for his coaching contributions in track and field, as well as for various personal records he has set in cross-country skiing and cycling. His interest in track and field started early. He founded his own track club in Sept-Îles, his small hometown in north-east Quebec, using an oval-shaped street for the track. A few years later, some of his athletes made it to the provincial and national level. One of them, Guillaume Leblanc, became the world record holder for 30 km race walking in 1991 and was a silver medalist at the Barcelona Olympic Games in 1992. During those years, Professor L'Ecuyer served as a coach at the Olympic Games, the Commonwealth Games, and World Championships. He was named “coach of the year” in 1985 and 1992 by the Quebec Track and Field Federation.

After 1992, having learned how to train athletes to world-class performance levels, he became a competitor himself, in cross-country skiing and road cycling. He won a bronze medal in the Canadian cross-country skiing championship (50 km classic) in 1994. He was Canadian champion in road cycling (by age group) in 2000, 2001, 2011, and 2012, and second in 2002 and 2004. He was Quebec champion in road racing in 1996, 2000, 2001, 2003, 2012; and in time trials in 2002, 2003, 2004, 2005, and 2012. He won the America's Cup in 2000 and 2012. In 2012, he was named cyclist of the year in the masters category by the Quebec Cycling Federation. He harbors ambitions of more such championships in the years ahead.

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