

Gregory J. Chaitin CV

Gregory Chaitin is a professor in the Production Engineering Program at the Universidade Federal do Rio de Janeiro (UFRJ) in Brazil. He is the discoverer of the remarkable Omega number — which shows that God plays dice in pure mathematics — and is now trying to create a general mathematical theory of biological evolution.

Before emigrating to Brazil he worked for many years at the IBM Watson Research Center in New York.

He has an honorary doctorate from the University of Córdoba in Argentina, and is an honorary professor at the University of Buenos Aires. He has also taught at the Instituto de Sistemas Complejos de Valparaíso in Chile, where he is Presidente Honorario del Comité Científico, and in the Programa de História das Ciências e das Técnicas e Epistemologia (HCTE) at the UFRJ.

One of his books, *MetaMat! Em Busca do Ômega*, was published in São Paulo by Perspectiva in 2009. Another book, *Matemáticas, Complejidad y Filosofía: Conferencias pronunciadas en Canadá y Argentina*, was published in Valparaíso in 2011 by Midas in a bilingual Spanish/English edition.

Professorships

1. Professor, Federal University of Rio de Janeiro, Brazil, 2011.
2. Honorary professor, University of Buenos Aires, Argentina, 2002.

Other Honors

1. Doctorate *honoris causa*, University of Córdoba, Argentina, 2009.
2. Leibniz Medal, awarded by Wolfram Research, 2007.
3. Doctorate *honoris causa*, University of Maine, USA, 1995.

Books by Chaitin

1. *Algorithmic Information Theory*, Cambridge University Press, 1987.
2. *Information, Randomness and Incompleteness: Papers on Algorithmic Information Theory*, World Scientific, 1987, 2nd edition, 1990.
3. *Information-Theoretic Incompleteness*, World Scientific, 1992.
4. *The Limits of Mathematics: A Course on Information Theory and the Limits of Formal Reasoning*, Springer, 1998. Also in Japanese.
5. *The Unknowable*, Springer, 1999. Also in Japanese.
6. *Exploring Randomness*, Springer, 2001.

7. *Conversations with a Mathematician: Math, Art, Science and the Limits of Reason*, Springer, 2002. Also in Portuguese and Japanese.
8. *From Philosophy to Program Size: Key Ideas and Methods. Lecture Notes on Algorithmic Information Theory from the 8th Estonian Winter School in Computer Science, EWSCS '03*, Tallinn Institute of Cybernetics, 2003.
9. *Meta Math! The Quest for Omega*, Pantheon, 2005. Also UK, French, Italian, Portuguese, Japanese and Greek editions.
10. *Teoria algoritmica della complessità*, Giappichelli, 2006.
11. *Thinking about Gödel and Turing: Essays on Complexity, 1970–2007*, World Scientific, 2007.
12. *Matemáticas, Complejidad y Filosofía: Conferencias pronunciadas en Canadá y Argentina*, Midas, 2011.
13. *Gödel's Way: Exploits into an Undecidable World*, (co-authored with N. da Costa and F. A. Doria), CRC Press, 2012.
14. *Proving Darwin: Making Biology Mathematical*, Pantheon, in press.

Selected Papers by Chaitin

1. "Information-theoretic computational complexity," *IEEE Transactions on Information Theory* IT-20 (1974), pp. 10–15.
2. "Information-theoretic limitations of formal systems," *Journal of the ACM* 21 (1974), pp. 403–424.
3. "A theory of program size formally identical to information theory," *Journal of the ACM* 22 (1975), pp. 329–340.
4. "Randomness and mathematical proof," *Scientific American* 232, No. 5 (May 1975), pp. 47–52.
5. "Algorithmic information theory," *IBM Journal of Research and Development* 21 (1977), pp. 350–359, 496.
6. "Gödel's theorem and information," *International Journal of Theoretical Physics* 21 (1982), pp. 941–954.
7. "Randomness in arithmetic," *Scientific American* 259, No. 1 (July 1988), pp. 80–85.
8. "A random walk in arithmetic," *New Scientist* 125, No. 1709 (24 March 1990), pp. 44–46.
9. "Le hasard des nombres," *La Recherche*, No. 232 (May 1991), pp. 610–615.

10. C. Calude, G. Chaitin: “Randomness everywhere,” *Nature* 400 (1999), pp. 319–320.
11. “Computers, paradoxes and the foundations of mathematics,” *American Scientist* 90 (2002), pp. 164–171.
12. “Paradoxes of randomness,” *Complexity* 7, No. 5 (May/June 2002), pp. 14–21
13. “L’Univers est-il intelligible?,” *La Recherche*, No. 370 (December 2003), pp. 34–41.
14. “The limits of reason,” *Scientific American* 294, No. 3 (March 2006), pp. 74–81.
15. “An algebraic characterization of the halting probability,” *Fundamenta Informaticae* 79 (2007), pp. 17–23.
16. “Evolution of mutating software,” *Bulletin of the European Association for Theoretical Computer Science* 97 (February 2009), pp. 157–164.
17. “Leibniz, complexity and incompleteness,” *APA Newsletter on Philosophy and Computers* 9, No. 1 (Fall 2009), pp. 7–10.
18. C. Calude, G. Chaitin: “What is a halting probability?,” *AMS Notices* 57 (2010), pp. 236–237.
19. “Metaphysics, metamathematics and metabiology,” in H. Zenil, *Randomness Through Computation*, World Scientific, 2011.
20. “Life as evolving software,” in H. Zenil, *A Computable Universe*, World Scientific, in press.

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