

Dynamical Systems, Chaotic Behaviour: Uncertainty, Linear Cocycles and Lyapunov Exponents

Jacob Palis

2010 Balzan Prize for Mathematics (pure and applied)

Balzan GPC Adviser: Étienne Ghys

Project Director: Jean-Christophe Yoccoz †, Supervisor

Affiliated Institution: Instituto de Matemática Pura e Aplicada (IMPA), Rio de Janeiro

Period: 2011-2016

Websites: <https://impa.br/sobre/memoria/reunioes-cientificas/first-palis-balzan-international-symposium-on-dynamical-systems/>;

<https://impa.br/sobre/memoria/reunioes-cientificas/second-palis-balzan-international-symposium-on-dynamical-systems/>;

<https://impa.br/sobre/memoria/reunioes-cientificas/third-palis-balzan-international-symposium-on-dynamical-systems/>

Jacob Palis is a Professor at the Instituto de Matemática Pura e Aplicada (IMPA) in Rio de Janeiro. The objective of his research project involved scientists from different regions of the world, in particular, talented young mathematicians. One of its main goals is to advance a Global Conjecture, stated by Palis twenty years ago, concerning the finiteness of the number of attractors for typical dynamics in closed manifolds. Other important topics were linear cocycles and Lyapunov exponents. Coordinated together with Fields Medalist Jean-Christophe Yoccoz (Collège de France) at the Instituto de Matemática Pura e Aplicada, IMPA, Rio de Janeiro, Brazil, the project set out to study (and hopefully prove) a set of conjectures for dynamical systems leading to a global perspective in this important branch of mathematics.

The Research Project extended beyond its originally scheduled dates from 2011 to 2015. Part of the funds supported the activities of young researchers at IMPA in research on *Dynamical Systems, Chaotic Behaviour-Uncertainty*, and three Palis-

Balzan Symposia on Dynamical Systems also took place during that period. The first was held at IMPA in 2012, and the following two Symposia took place at the Institut Henri Poincaré in Paris in 2013 and 2015. These symposia were designed to review advances and to stimulate further progress along the lines of the research project.

The Third Palis–Balzan Symposium on Dynamical Systems was organized by IMPA and Collège de France, with support from CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior), CNRS, ANR, IMPA (Associação Instituto Nacional de Matemática Pura e Aplicada), Institut Henri Poincaré, Mairie de Paris, Université Paris 13 and Université Paris-Sud 11. It aimed at promoting research at the highest level in the area of dynamical systems, with the effective participation of outstanding groups of researchers at the world level. The symposia also aimed at putting doctoral students and young researchers in touch with the best of what is produced worldwide on the above and related topics, disseminating recent results and providing high level international scientific exchange of ideas and results. In particular, it stimulated the further development of the Brazilian group in the area.

Another International Conference on Dynamical Systems was held from 4 to 8 July 2016 in Rio de Janeiro. Jacob Palis (IMPA) acted as Coordinator, and the other members of the Organizing Committee were Artur Avila (IMPA and CNRS), Sylvain Crovisier (CNRS), Carlos Matheus Santos (CNRS Paris, France), Marcelo Viana (IMPA) and Jean-Christophe Yoccoz (Collège de France).

Since 2016, related events include a conference–satellite of ICM 2018, in Dynamical Systems, where Palis was a plenary speaker (https://impa.br/en_US/eventos-do-imp/ eventos-2018/dynamical-systems-and-related-topics/), and a conference on the Prizewinner, the Conference Jacob Palis at IMPA (https://impa.br/en_US/eventos-do-imp/2020-2/jacob-palis/).

For details on the programmes of the Palis–Balzan Symposia, the reader is referred to previous editions of the *Overview* of the Balzan research projects, which are available on the Balzan Foundation website at:
<https://www.balzan.org/en/prizewinners/jacob-palis/research-project-palis>.

Jacob Palis: Recent Publications

On the Finiteness of Attractors for piecewise C^2 Maps of the Interval, with Paulo

- Brandão, e Vilton Pinheiro, <http://arxiv.org/abs/1506.00276>, *Ergodic Theory and Dynamical Systems*, accepted for publication (2017).
- An Estimate on the Hausdorff Dimension of Stable Sets of Non-Uniformly Hyperbolic Horseshoes, with Carlos Matheus, *Discrete and Continuous Dynamical Systems*, vol. 38, n.2 p. 431-448, 2018.
- Non-Uniformly Hyperbolic Horseshoes in the Standard Family, with Carlos Matheus and Carlos Gustavo Moreira, *C.R. Math. Acad. Sci. Paris*, 356 (2018), no. 2, 146-149.
- Stable Sets of Certain Non-Uniformly Hyperbolic Horseshoes Have the Expected Dimensions, with Carlos Matheus and Jean-Christophe Yoccoz, accepted at the *Journal of the Institute of Mathematics of Jussieu*, 2019.
- Wellington de Melo and Jacob Palis: their first meeting, some of their work on structural stability and a lifetime of friendship, with Fernando Lenarduzzi, accepted in *New Trends in One-Dimensional Dynamics*, Springer, 2019.