Jacob Palis was born in Uberaba, in the Brazilian state of Minas Gerais, on March 15, 1940. By the age of 16, he moved to Rio de Janeiro, then the national capital, where he graduated in Engineering from the University of Brazil in 1962, when he was awarded the Prize of the University Best Graduating Student.

Decided to pursue high level scientific research, in 1964 he went on to join the University of California at Berkeley. There, in 1967, he obtained the Ph.D. degree under the supervision of Steve Smale, a 1966 Fields Medalist.

In his PhD thesis, Palis proved that gradient-like (or Morse-Smale) dynamical systems in lower dimensions are stable, meaning that their orbit structure remains qualitatively the same under small perturbations of the evolution law. This remarkable result, which provided the first class of stable systems existing on any smooth configuration space (manifold), brought to maturity the theory of structural stability, that had been initiated by Andronov and Pontryagin some three decades before. Equally important, the methods of proof embodied a new geometric approach that was going to fundamentally influence the subsequent developments in the field: he created the notion of stable foliations being partially subfoliated to include the ones of critical points (or isolated periodic motions) of higher indices where they accumulate upon.

Right after that, in a joint work with Smale, the result in his thesis was extended to all dimensions and the authors formulated the famous Stability Conjectures, that proposed precise conditions for a dynamical system to be stable, or stable restricted to its limit-set. These conjectures were a major topic of research in the area until they were solved, some twenty years later, most remarkably by Mañé, one of Palis first doctoral students, in the case of global stability, and by Palis himself, in the case of limit-set stability (Publ. Math. IHES). These results were established for discrete-time systems. Important partial progress had been obtained, among other mathematicians, by de Melo, another of his doctoral students, whose thesis contained a considerable extension of Palis geometric approach (Invent. Math). The conjectures for flows were later proved by Hayashi (Annals of Math). The solution of the Palis-Smale Stability Conjectures remains, no doubt, one of the most beautiful achievements in dynamical systems.

In 1968, Palis returned to Rio de Janeiro to undertake a career at the Instituto de Matemática Pura e Aplicada (IMPA), an institution of which he would rapidly become part of the soul and a main driving force. His influence and leadership were

fundamental in making IMPA one of the finest scientific centers in the developing world and a reference for excellence in mathematics in global terms.

Upon his return to Brazil, he broadened his research goals considerably. While stability would remain close to his heart, the 1970's saw him making fundamental pioneer contributions to the theory of bifurcations. He and his colleagues, most especially Newhouse and Takens, developed a very successful approach based on considering parametrized families of dynamical systems obtained by deformation of a stable one, and analyzing the first bifurcation parameter for which stability breaks down. Also, around this time, he proved with F. Takens that most parametrized families of gradient-like vector fields are stable. The proof is a notable demonstration of the power of the geometric method, and this work, was published in the Annals of Mathematics.

Another relevant front in his work was the use of certain smooth invariants for topological equivalence of dynamical systems. These invariants are very efficient tools for the classification of dynamical systems and have been used by several authors in contexts that extend by far the original one, for instance in the classification of linear holomorphic vectors fields. He presented this work in 1978 in an invited address at the International Congress of Mathematicians - ICM, held every four years by the International Mathematical Union - IMU.

In the early eighties, Palis became increasingly interested in another branch of research where he would make another and most lasting impact in dynamics in the recent two to three decades: the unfolding of homoclinic tangencies. Unfolding homoclinic tangencies is a major mechanism for complex dynamical behavior, discovered by the great French mathematician Henri Poincaré at the end of the 19th century and studied by several important dynamicists, like Birkhoff, Cartright-Littlewood and Smale. The work of Palis and his outstanding collaborators, specially Newhouse, Takens, Viana, and Yoccoz, who is also a Fields Medal laureate, showed that the creation of such dynamics through homoclinic bifurcations is accompanied by a remarkable variety of other complex dynamical changes.

Indeed, going beyond that conclusion, Palis has formulated a series of conjectures to the effect that homoclinic bifurcations are *the key mechanism* underlying global instabilities of the dynamical behavior. These Palis conjectures have been a central topic of research in the area in the last decade or so, by mathematicians in France, Japan, China, United States, England, Brazil and other countries in Latin American and elsewhere. They generated a remarkable scientific activity as can be seen by a dozen plenary and invited lectures at the last ICM´s, especially at Zurich, Berlin and Beijing.

Palis' collaboration with Yoccoz, which now includes 9 scientific papers, started in the late 1980's, with the series of articles where they solved the problem of centralizers for hyperbolic dynamical systems: they proved that the majority of such systems admit only trivial smooth symmetries. These results, as well as their work on homoclinic

bifurcations published in the famous journal Acta Mathematica, were explicitly cited on the occasion when Yoccoz received the Fields Medal, in 1994.

One of, the greatest contribution of Palis in the study of homoclinic tangencies is to have unveiled the fundamental role played by fractal dimensions in connection with the frequency of dynamical bifurcations. Fractal dimensions were introduced in the 19th century, starting with the German mathematician Hausdorff, and were much advertised in the late 1970's when the development of personal computers led Mandelbrot, Feigenbaum, and other scientists to the discovery of many important objects and phenomena with a fractal nature.

In Palis' own work, particularly in the joint papers with Takens, Viana, and Yoccoz published in main journals such as the Annals of Mathematics, Inventiones Mathematicae, and Acta Mathematica, fractal dimensions intervene in a completely new way, determining in a very precise sense the frequency of stable dynamical behavior. In fact, inspired by these discoveries, Palis formulated a deep conjecture relating the structure of the arithmetic difference of fractal (Cantor) sets to their fractal dimensions. This difficult problem was solved only a few years later by Moreira, another of Palis' students, together with Yoccoz, in a paper that was also published in the Annals of Mathematics.

Jacob Palis has an equally impressive record as mentor and trainer of talented young mathematicians. To this date, he has directed 41 doctoral students, originating from Argentina, Chile, Iran, Italy, Mexico, Peru, Portugal, Spain, Uruguay, Venezuela, Brazil, many of whom have acquired worldwide notoriety in their fields of research by themselves. In particular, four of his students have been invited speakers at the International Congress of Mathematicians, four of them have received the TWAS award in mathematics, and two of them were awarded the recently created Ramanujan Prize of the International Center of Theoretical Physics. Also, many of his students are among the most active mathematicians in their countries and that has greatly contributed to the dissemination of high quality research in a varied set countries in the world.

It is hard to overestimate the role of Jacob Palis in the remarkable advancement of mathematics in Brazil and Latin America and world at large over the last decades.

Palis was a founder and the first Scientific Coordinator of UMALCA, the Mathematical Union for Latin America and the Caribbean, which was created in Rio de Janeiro in 1995. Under his inspiration the Union became a model for collaboration network, promoting the development of Mathematics and the mobility of young researchers in the region. Remarkably, Palis was the Director of the National Institute for Pure and Applied Mathematics – IMPA, Rio de Janeiro, for ten years (1993-2003), a period during which the Institute achieved and consolidated its position as the leading research center it is today.

In the period 2001-2005, together with Phillip Griffiths, he has played a fundamental role in the launching of the Millennium Science Institutes, a major project for a remarkable advancement of Science in Brazil.

More globally, Jacob Palis has been active at the highest level of several international institutions. He was a member of the Executive Committee of the International Mathematical Union - IMU for unprecedented six consecutive terms, from 1983 through 2006, including eight years as Secretary General and four years as President. His term as the President of IMU was distinctly marked by an opening of the Union towards other Sciences, as well as by a focus on bringing mathematical development to all parts of the world, with a special emphasis on developing countries. Equally important, he led IMU to provide full support to the government and scientific community of Norway in the creation of the Abel Prize in order to immortalize the greatest mathematicians of our time, without limitation of age as in the Fields Medal.

These same policies have been driving Palis' action as member from early 90´s through 2005, and then Chair for two years, of the Scientific Council of the International Center for Theoretical Physics in Trieste, where he helped to create the Ramanujan Prize for young mathematical researcher from the developing countries. It's important to point out his enormous contribution to the Academy of Sciences for the Developing World – TWAS, as a former Secretary General and now its President. The same applies to the Brazilian Academy of Sciences.

All his PhD theses supervision and broad contribution to science worldwide have by no means hampered Palis' great capacity to remain at the forefront of research, and be a permanent source of ideas in dynamical systems. By the late 1980`s, new fundamental developments were taking place on the study of chaotic systems. Foremost among them was the first rigorous proof, by the Swedish mathematicians Benedicks and Carleson, of the existence of strange attractors in the Hénon model of planar transformations. Immediately upon their announcement, and much before the actual paper appeared, Palis conjectured that the same conclusion should remain true in the much more general context of homoclinic bifurcations. This conjecture was fully confirmed by Mora and Viana, then doctoral students under the supervision of Palis, in a paper that was published in Acta Mathematica and played a crucial role in the much progress that followed.

These and other developments further consolidated the conclusion that Smale`s uniform hyperbolicity, although an important ingredient, is far from being sufficient for describing "most" dynamical systems. Indeed, during the 1970's it became commonly accepted that such a broad picture might not even be possible. However, by 1995, Palis formulated a bold series of ideas and conjectures that encompassed a global view of Dynamics, with a much more probabilistic flavor than had been attempted before. The Palis Program, as it is often called, roughly states that most systems should display only finitely many attractors, where trajectories accumulate upon in the future. It has been remarkably successful in the case of low dimensional systems, such as transformations of the line, where its completion may be envisaged for the near future. There is also good progress in the general case. In fact, the program has

already played, and it will do so in years to come, a fundamental role guiding current research and setting exciting partial goals. It also maybe applicable to other branches of science, such as turbulence molded by evolution equations, at least for complete solutions that accumulate upon a finite dimension space in the future.

Palis himself has been making important contributions in this direction, specially through his new and very exciting joint project with Yoccoz, where they study the formation of ‘’strange horseshoes’’ in the unfolding of homoclinic tangencies. Their recent (2010) and long paper, extending over 200 pages, brings the theory of strange chaotic dynamics to a new level of sophistication and precision, and is bound to become another landmark in the field. It has appeared by invitation in the very prestigious journal Publications Math. IHES (Inst. des Hautes Etudes. Scient.)

It is to be noted that Palis has received a remarkable list of recognitions of scientific merit. Among those, nine honorary doctorates and professorships from universities in six different countries and the Chinese Academy of Sciences, membership of Academies of Sciences (from 15 Academies), including the US National Academy of Sciences, the French, Russian, Norwegian, Portuguese Lisbon, Italian Lincei, Germany Leopoldina and Indian Academies of Sciences, and high distinctions in Brazil and abroad, like the Brazilian Grand-Croix National Order of Scientific Merit and the French Légion d`Honneur, besides invitations to very prestigious meetings and distinguished special lecturers. The list also includes major Science Prizes in Brazil, and Mexico, from the Organization of American States, Academy of Sciences for the Developing World and Trieste, Accademia dei Lincei and recently the most distinguished Balzan Prize.

Extracted from a text written
by Marcelo Viana
with minor modifications.

Born: March 15, 1940 – Uberaba, MG, Brazil
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Children: 3
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Degrees
Bachelor (Engineering) : Federal University of Rio de Janeiro, 1962
Master: University of California - Berkeley, 1966
PhD: University of California – Berkeley, 1967

Fellowships

National Research Council of Brazil, Doctoral Fellowship, 1965-1967

- Guggenheim Foundation, Post-Doctoral Fellowship, University of California - Berkeley, 1973

Present Positions

- Professor, Instituto Nacional de Matemática Pura e Aplicada – IMPA, since 1971.
- Past-President, The World Academy of Sciences - for the advancement of science in the developing countries – TWAS, Jan 2013 – Dec 2015
- President, Brazilian Academy of Sciences – ABC, May 2007- April 2012

PhD Students, 41 theses concluded to date
PhD Descendants: Over 172 to date

Research Areas

- Global Stability of Dynamical Systems;
- Bifurcations and Fractional Dimensions;
- Global Scenario for Dynamical Systems, Chaotic Systems. Estimating Uncertainties.

Awards

- Prize Moinho Santista, highest Brazilian prize for Science at the time, 1976.
- Prize Academy of Sciences for the Developing World - TWAS, Mathematics, 1988.
- National Prize for Science and Technology, awarded by the President of Brazil, 1990.
- InterAmerican Prize for Science, Organization of the American States, 1995.
- Prize Mexico for Science and Technology, awarded by the President of Mexico, 2001.
- Trieste Science Prize, 2006
- International Prize Accademia Nazionale dei Lincei in Mathematics 2008
- Balzan Prize 2010 in Mathematics, 2010
- Solomon Lefschetz Medal, 2013 – Mathematical Congress of the Americas

Academies of Sciences

- Member, Brazilian Academy of Sciences, 1970.
- Member, Academy of Sciences for the Developing World, 1991.
- Member, Latin American Academy of Sciences, 1992
- Member, Indian Academy of Sciences, 1996.
- Member, Chilean Academy of Sciences, 1997.
- Foreign Member, Mexican Academy of Sciences, 2000.
- Foreign Member, United States National Academy of Sciences, 2001.

- Foreign Member, French Academy of Sciences, 2002.
- Member, European Academy of Sciences, 2004.
- Member, Norwegian Academy of Sciences, 2005.
- Member, Russian Academy of Sciences, 2006
- Member, Indian National Science Academy, 2008
- Member, German Academy of Sciences Leopoldina, 2010
- Foreign Member, Accademia Nazionale dei Lincei, 2010
- Foreign Member of the Lisbon Academy of Sciences, 2011

Especial
Meritorious Member of the Brazilian National Academy of Medicine, 2013.

Distinctions

- Grand-Croix National Order of Scientific Merit, awarded by the president of Brazil, 1994.
- Medal Lecture - Academy of Sciences for the Developing World - TWAS, Italy, 1998.
- Medal of Scientific Merit Carlos Chagas Filho State of Rio de Janeiro, 2000.
- Medal of Honour - CAPES, Brazilian Ministry of Education, Brazil, 2001.
- Chevalier de la Legion d'Honneur, awarded by the president of France, 2005.
- Honorary Associate of the Brazilian Mathematical Society, 2009
- Engineering Year Medal , 2010 – Brazilian National Engineering Club
- Tamandaré Merit Medal of the Brazilian Nave, 2010
- Order of Legislative Merit of the State of Minas Gerais, 2011

Honorary Doctorates / Professorships

- Doctor Honoris Causa, State University of Rio de Janeiro, 1990.
- Doctor Honoris Causa, University of Chile, 1996.
- Doctor Honoris Causa, University of Warwick, United Kingdom, 2000.
- Doctor Honoris Causa, University of Santiago de Chile, 2000.
- Doctor Honoris Causa, Universidad de la Habana, Cuba, 2001.
- Doctor Honoris Causa, Universidad de Ingenieria, Peru, 2003.
- Doctor Honoris Causa, Federal University of Rio de Janeiro, 2011
- Honorary Einstein Professor – Chinese Academy of Sciences (CAS), 2011
- Honorary Professor – Peking University, 2011
- Doctor Honoris Causa, Universidade Nacional de Cordoba, 2012
- Doctor Honoris Causa, Federal University of Pernambuco, 2012

Special Invited Lectures and Other Distinctions

- Invited speaker, International Congress of Mathematicians, Helsinki, 1978.

- Invited as a main speaker to major international conferences:

  - Lefschetz Centennial Conference (IPN-Mexico and Princeton University, l984).
  - Conference in Honour of René Thom (Institut Henri Poincaré, 1988).
  - Conference in Honour of Stephen Smale (University of California - Berkeley, l990).
  - Conference in Honour of A.N. Kolmogorov (Euler Institute, St. Petersburg, 1992).
  - Conference in Honour of Adrien Douady (Univ. Paris, 1995).
  - Conference in Honour of J. Moser (ETH-Zurich, 2001).
  - Conference in Honour of I.G. Petrovsky (Moscow University, 2001).
  - Conference in Honour of F. Takens (University of Groningen, Holand, 2001).
  - Conference in Honour A.N. Kolmogorov (Moscow University, 2003)

- Hallim Distinguished Lecture - The Korean Academy of Science and Technology, 1999.
- Newton's Distinguished Lecture, Jawaharlar Nehru Centre for Advanced Scientific Research, 2001.
- Honoured with two volumes in Asterisque Journal, on the occasion of the sixtieth anniversary: Geometric Methods in Dynamics, 2003.

Services to Brazilian Scientific Institutions and Community

- Director, Instituto Nacional de Matemática Pura e Aplicada – IMPA, 1993-2003
- Vice-President Brazilian Society for the Promotion of Science – SBPC, 1993-1999
- Member of the Scientific Council, National Research Council of Brazil - CNPq, 1988-1992; 1994-1998; 2001-2005
- Member of the Board of the Brazilian Academy of Sciences – ABC, 1977-1981, 2004-2007
- President of the Council, Rio de Janeiro State Foundation for the Promotion of Sciences - FAPERJ, 1995-1996; Member of the Council until 2000
- President, Brazilian Academy of Sciences, 2007 until now

Services to International Scientific Institutions and Community

- Member of Executive Board, International Mathematical Union – IMU, 1982-1991.
- Member of the Scientific Advisory Committee of the ETH, Zurich, - since 1990.
- Secretary, International Mathematical Union – IMU, 1991-1999.
- Member of Executive Board, International Council for Science – ICSU, 1993-1996.
- Member of the Scientific Committee, International Center for Theoretical Physics – ICTP, Trieste, Italy, since 1993. Chair: 1993-1996.
- Founding Member of the Latin American and Caribbean Mathematical Union – UMALCA, 1995 and chair of its first Scientific Committee.
- Vice-President, International Council for Science – ICSU, 1996-1999.

- President, International Mathematical Union – IMU, 1999-2002.
- Secretary General, Academy of Sciences for the Developing World – TWAS, 2000-2003; 2004-2006.
- Member of the Scientific and Strategic Committee of the Collège de France, COSS, since 2003 – 2010.
- Co-Coordinator of the Study Panel responsible for the InterAcademy Council's Report: "Inventing a Better Future: A Strategy for Building Worldwide Capacities in Science and Technology" launched at the United Nations in February 2004 by the Secretary General Kofi Annan.
- President, Academy of Sciences for the Developing World – TWAS Jan 2007 - Dec 2009; Jan 2010 – Dec 2012

Editorial Board of Scientific Journals

- Ergodic Theory and Dynamical Systems, 1980-1988.
- Nonlinearity, London Mathematical Society, 1988-1993.
- Acta Applicandae Mathematicae, up to 2005;

And, currently

- Bulletin of the Brazilian Mathematical Society - Chief Editor;
- Annales de l'Institut Henri Poincaré;
- Chinese Annals of Mathematics
- Communications in Contemporary Mathematics
- Moscow Mathematical Journal

Selected Publications (complete list includes more than 80 papers in main journals)

1. On Morse-Smale Dynamical Systems
   Topology 8, (385-405), 1968

2. Neighborhoods of hyperbolic sets
   with M. Hirsch, C. Pugh, and M.Shub, *Invent. Math*., 9, (121-134), 1969/1970.

3. Structural Stability Theorems
   with S.Smale, *Proceedings of the Institute on Global Analysis, American Math. Society*,
   Vol. XIV, (223-232), 1970.

4. Vector fields generate few diffeomorphisms
   Bull. Amer. Math. Soc., 80(503-505),1974.

5. Cycles and bifurcation theory

with S. Newhouse, *Astérisque*, 31(43-140), 1976.

6. Topological equivalence of normally hyperbolic dynamical systems
with F. Takens, *Topology*, 16(4) (335-345), 1977.

7. Moduli of Stability and Bifurcation Theory
Proceedings of the International Congress of Mathematicians, Helsinki, (835-839), 1978.

8. The topology of holomorphic flows with singularity
with C. Camacho and N. H. Kuiper*, Publications Mathematiques Institut Hautes Études Scientifiques*., 48(5-38), 1978.

9. A differentiable invariant of topological conjugacies and moduli of stability.
Astérisque, 51(335-346), 1978.

10. Bifurcations and Stability of Families of Diffeomorphisms
with S. Newhouse and F. Takens, *Publications Mathematiques Institut Hautes Études*
Scientifiques, 57 (5-72), 1983.

11. Stability of Parameterized Families of Gradient Vector Fields
with F. Takens, *Annals of Mathematics* ,118 (383-421), 1983.

12. Cycles and measure of bifurcation sets for two-dimensional diffeomorphisms
with F. Takens, *Inventiones Mathematical*, 82(397-422), 1985.

13. Hyperbolicity and Creation of Homoclinic Orbits
with F.Takens, *Annals of Mathematics*, 125 (337-374), 1987.

14. On the C^1 □-Stability Conjecture
Publications Mathematiques Institut Hautes Études Scientifiques, 66 (210-215), 1988.

15. Bifurcations and Global Stability of Families of Gradients
with M.J. Carneiro, *Publications Mathematiques Institut Hautes Études Scientifiques*, 70, (103-168), 1989.

16. Homoclinic Tangencies for Hyperbolic Sets of Large Hausdorff Dimension
with J.C. Yoccoz, *Acta Mathematica* 172, (91-136), 1994.

17. High dimension diffeomorphisms displaying infinitely many periodic attractors
with M. Viana, *Annals of Mathematics*, 140(1) (207-250), 1994.

18 . A Global View of Dynamics and a Conjecture on the Denseness of Finitude of Attractors
Astérisque, 261, (339-351), 2000.

18. Nonuniformily Hyperbolic Horseshoes Unleashed by Homoclinic Bifurcations and Zero Density of Attractors
with J.C.Yoccoz*, C.R.A.S. Paris*, 333, (1-5), 2001.

19. A Global Perspective for Non-Conservative Dynamics
Ann. Inst. Henri Poincaré, *Analyse Non Lineaire*, Vol. 22,(485-507), 2005.

20. Palis, J. On Djairo de Figueiredo.
A mathematician. *Contributions to nonlinear analysis,* xi--xii, Progr. Nonlinear Differential Equations Appl., 66, *Birkhäuser, Basel,* 2006.

21. Open Questions Leading to a Global Perspective in Dynamics
Invited paper Nonlinearity 21 (2008) T37-T43

22. Non-Uniformly Hyperbolic Horseshoes Arising from Bifurcations of Poincaré Heteroclinic Cycles with J.C. Yoccoz , *Publications Mathematiques Institut Hautes Études Scientifiques*, No. 110 (2009), 1—217.

Complete List of Publications

1. On Morse-Smale Diffeomorphisms
Bulletin American Math. Society, 741, (985-988), 1968.

2. On Morse-Smale Dynamical Systems
Topology, 19, (385-405), 1969.

3. Structural Stability Theorems
with S.Smale*, Proceedings of the Institute on Global Analysis, American Math. Society, Vol. XIV, (223-232), 1970.*

4. A Note on Ω -Stability
Proceedings of the Institute on Global Analysis, American Mathematical Society, Vol. XIV, (220-222), 1970.

5. Local Structure of Hyperbolic Fixed Points in Banach Space
Anais da Academia Brasileira de Ciencias, 40, (263-266), 1968.

6. Neighborhoods of Hyperbolic Sets

with M.Hirsch*, C. Pugh and M. Shub, Inventiones Mathematicae, 9, (212-234), 1970.*

7. Ω-Explosions
Bulletin of the Brazillian Mathematical Society, 1, (55-57), 1970.

8. Ω -Stability and Explosions
Lecture Notes in Mathematics, 1206, Springer-Verlag, (40-42), 1971.

9. Ω -Explosions for Flows
Proceedings American Math. Society, 27, (85-90), 1971.

10. Sistemas Dinamicos, Seminar Notes, IMPA, 1971.

11. Hyperbolic Nonwandering Sets on Two-Dimensional Manifolds
with S. Newhouse*, in Dynamical Systems, Academic Press, (293-302), 1973.*

12. Bifurcations of Morse-Smale Dynamical Systems
with S. Newhouse*, in Dynamical Systems, Academic Press, (303-366), 1973.*

13. Vector Fields Generate Few Diffeomorphisms
Bulletin American Mathematical Society, 80, (503-505).

14. Non Differentiability of Invariant Foliations
with C. Pugh and C. Robinson*, Lecture Notes in Mathematics, 468, Springer-Verlag, (234-241), 1975.*

15. Genericity Theorems in Topological Dynamics
with C. Pugh, M. Shub and D. Sullivan*, Lecture Notes in Mathematics, 468, Springer-Verlag, (241-251), 1975.*

16. Fifty Problems in Dynamical Systems
with C. Pugh*, Lecture Notes in Mathematics, 468, Springer-Verlag, (345-353), 1975.*

17. Arcs of Dynamical Systems: Bifurcations and Stability
Lecture Notes in Mathematics, 468, Springer-Verlag, (48-53), 1975.

18. Cycles and Bifurcations Theory
with S. Newhouse*, Astérisque, 31, (44-140), 1976.*

19. Stable Arcs of Diffeomorphisms
with S. Newhouse and F. Takens*, Bulletin American Mathematical Society, 82, (499-502), 1976.*

20. La Topologie du Feuilletage d'un Champ de Vecteurs Holomorphe près d'une Singularitè
with C. Camacho and N. Kuiper*, C.R. Acad. Sc. Paris, 282, (959-961), 1976.*

21. The Topology of Holomorphic Flows near a Singularity

with C. Camacho and N. Kuiper*, Publications Math. Institut Hautes Études Scientifiques, 48, (5-38), 1978.*

22. Topological Equivalence of Normally Hyperbolic Vector Fields
with F. Takens*, Topology, 16, (335-345), 1977.*

23. Some Developments on Stability and Bifurcations of Dynamical Systems
Lecture Notes in Mathematics, 597, Springer-Verlag, (495-509), 1977.

24. Geometry and Topology
editor, with M. do Carmo*, Proc. of the III Latin American Mathematical School, Lecture Notes in Mathematics, 597, Springer-Verlag, 1977.*

25. Introdução aos Sistemas Dinamicos
with W.de Melo*, Notes of the X Bazilian Mathematical Colloquium, 1975, and book in Projeto Euclides, IMPA-CNPq, 1978.*

26. Centralizeres of Diffeomorphisms and Stability of Suspended Foliations
Lecture Notes in Mathematics, 652, Springer-Verlag, (114-121), 1978.

27. Invariantes de Conjugação e Módulos de Estabilidade dos Sistemas Dinâmicos
Proceedings of the XI Brazilian Mathematical Colloquium, 1978.

28. A Differentiable Invariant of Topological Conjugacies and Moduli of Stability
Astérisque, 51, (335-346), 1978.

29. Moduli of Stability and Bifurcation Theory
Proceedings of the International Congress of Mathematicians, Helsinki, (835-839), 1978.

30. Moduli of Stability for Diffeomorphisms
with W. de Melo*, Proc. Symp. Dyn. Systems, Lecture Notes in Mathematics, 819, Springer Verlag, (318-339), 1980.*

31. Characterization of the Modulus of Stability for a Class of Diffeomorphisms
with W. de Melo and S.Van Strien*, Lecture Notes in Mathematics, 898, Springer-Verlag, (266-285), 1981.*

32. Families of Vector Fields with Finite Moduli of Stability

with I. P. Malta*, Lecture Notes in Mathematics, 898, Springer-Verlag, (212-229), 1981.*

33. Geometric Theory of Dynamical Systems
with W. de Melo*, Springer-Verlag, 1982.*
Translated into Russian and Chinese.

34. Bifurcations and Stability of Families of Diffeomorphisms
with S. Newhouse and F. Takens*, Publications Math. Institut Hautes Études Scientifiques, 57, (5-72), 1983.*

35. Geometric Dynamics
Proc. Int. Symposium Dynamical Systems, IMPA-1981. Lecture Notes in Mathematics, 1007, Springer-Verlag, 1983.

36. Stability of Parameterized Families of Gradient Vector Fields
with F. Takens*, Annals of Mathematics, 118, (383-421), 1983.*

37. A Note on the Inclination Lemma and Feigenbaum's Rate of Approach
Lecture Notes in Mathematics, 1007, Springer-Verlag (630-636), 1983.

38. The Dynamics of a Diffeomorphism and Rigidity of its Centralizer
Singularities and Dynamical Systems, North Holland, (15-21), 1985.

39. Topological Invariants as Translation Number
with R. Roussarie*, in Dynamical Systems and Bifurcations, Lecture Notes in Mathematics, 1125, Springer-Verlag, (64-86), 1985.*

40. Cycles and Measure of Bifurcation Sets for Two-Dimensional Diffeomorphisms
with F. Takens*, Inventiones Mathematicae, 82, (397-422), 1985.*

41. Homoclinic Orbits, Hyperbolic Dynamics and Fractional Dimension of Cantor Sets
Contemporary Mathematics, 58, (203-216), 1987.

42. Dimensões Fracionárias de Conjuntos de Cantor e Dinâmica Hiperbólica
Proceedings of the XV Brazillian Mathematical Colloquium, (341-353), 1987.

43. Hyperbolicity and Creation of Homoclinic Orbits
with F.Takens*, Annals of Mathematics, 125, (337-374), 1987.*

44. On the Solution of the Stability Conjecture (Mañé) and the □-Stability Conjecture
Proceedings of the XVI Brazillian Mathematical Colloquium, (599-606), 1988.

45. On the Continuity of Hausdorff Dimension and Limit Capacity for Horseshoes

with M.Viana*, Dynamical Systems, Lecture Notes in Mathematics, 1331, Springer-Verlag, (150-160), 1988.*

46. Homoclinic Bifurcations and Hyperbolic Dynamics
with F. Takens*, Lecture Notes, 66, Proceedings of the XVI Brazillian Mathematical Colloquium, (10-15), 1988.*

47. Topics in Dynamical Systems
Editor with R. Bamón e R. Labarca, Lecture Notes in Mathematics, 1331, Springer-Verlag, 1988.

48. On the Ω -Stability Conjecture
Publications Math. Institut Hautes Etudes Scientifiques, 66, (210-215), 1988.

49. On the Solution of the Stability Conjecture and the Ω -Stability Conjecture
IX International Congress on Mathematical Physics, Adam Higher, (469-471), 1989.

50. Rigidity of Centralizeres of Diffeomorphisms
with J.C.Yoccoz*, Ann. Scient. École Normale Superièure, 22, (81-98), 1989.*

51. Centralizers of Anosov Diffeomorphisms on Tori
with J.C.Yoccoz*, Ann. Scient. Ecole Normale Superieure, 22, (99-108), 1989.*

52. Homoclinic Bifurcations and Fractional Dimensions
Publicaciones Matematicas del Uruguay, 1, (55-66), 1989.

53. Gradient Flows, Stability Theory and Related Topics in Dynamical Systems
World Scientific, 1989 (142-145).

54. Bifurcations and Global Stability Families of Gradients
with M. J. Carneiro*, Publications Mathematiques Institut Hautes Etudes Scientifiques, 70, 1989 (103-168).*

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PhD. Students: 41

from eleven different countries

Ph.D. supervisor (theses concluded) of:

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