

CURRICULUM VITAE

1.- PERSONAL DATA.

Name: Eric Antonio Goles Chacc.
Nationality: Chilean citizen
Place work: Facultad de Ciencias y Tecnología
Universidad Adolfo Ibáñez
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Keywords: Complexity, Computer Science, Discrete Mathematics, Mathematical Modeling.

2.- GRADUATE STUDIES:

Institution	Date	Degree
University of Chile	1970-1975	Engineer
Catholic University	1972-1973	Studies in Philosophy
University of Grenoble (France)	1977-1980	Ph.D. in Engineering (Computer Science)
University of Grenoble (France)	1985	Ph.D. in Mathematics (Docteur d'Etat)

3.- WORK POSITIONS :

Institution	Charge	Date
Universidad Adolfo Ibáñez	Professor	2006-
International Fellow	researcher	2009-11
Santa Fe Institute, New Mexico		
University of Chile, Department of Mathematical Engineering	Professor	1974 – 2006
C.N.R.S. France	Researcher Directeur de Recherche classe exceptionnelle (DRCE)	1981 – 1986 (2003 – 2005)
Center for Mathematical Modeling	Director Researcher	1997 – March 2000 1997 – 2006
National Commission for Scientific and Technological Research (CONICYT)	President	March 2000 – March 2006
Institute for Complex Systems (Valparaíso)	Scientific Director	2003 – present

4.- AWARDS:

1. Ranked number three among the accepted applicants for positions in Applied Mathematics at C.N.R.S. – France, 1980 (number one among foreign applicants).
2. Unique Honorific of scientific prize M. Noriega Morales, O.E.A., (1986).
3. Incorporation to the National Academy of Sciences, (1990).

4. Prize Manuel Montt, Chile for the book Neural and Automata Networks, (1991).
5. National Prize of Sciences, 1993.
6. Best paper award in the International Congress Mathematics & Design, San Sebastián, Spain, (1998).
7. Honorable Son of the City and Distinguished Citizen, Antofagasta, Chile 1999.
8. BIOSFELLOW (member of scientific council) of Bios Group Company, Santa Fe, USA, (1999-2003).
9. Prize "Distinguished Persons", Universidad del Pacífico, 2000.
10. "Ordem do Rio Branco Grau de Comendador", Brasil Government (2002).
11. Special Issue of the Journal Theoretical Computer Science, in to honour my 50th Birthday (several authors, preface of Dr. Maurice Nivat, French Academy of Science), vol. 32 number 2 pp. 229-422 (2004)
12. Award to Distinguished Graduate. Commemoration of the 161st Anniversary of the University of Chile. (2003)
13. CNRS position as DRCE (Directeur de Recherche classe exceptionnelle (2003-)
14. Honored by The King of Spain.(2004)
15. Associated Research to the ATENEO of Politechnical Institute of Torino – Italy (2004 -).
16. Meritorious National Order Medal, in the degree of Knight (Government of France, July 2004)
17. Prize Jules Verne, Unesco-CNRS, Image & Science Festival, (Paris, September 2004)
(for a science open TV program in Chilean channel TVN)
18. Member of the ASP Scientific Committee (six members) - Alta Scuola Politecnica – ASP.(Milan, Turín, 2005).
19. Member of the team of experts of École Polytechnique Fédérale de Lausanne – EPFL's "International Scientific Advisory Board". (Lausanne, Switzerland, 2006).
20. Correspondent Member of the Croatian Academy of Science (2006 -)

5.- PARTICIPATION IN EDITORIAL BOARDS:

1. Networks, IOP Pub., England, (D. Amit, Racha Inst. - U. of Rome, editor in chief) 1990-94.
2. Connection Science, England (stable review panel), from 1989 - 1992
3. Theoretical Computer Science Journal, from 1994 – present.
4. Complexus, (S.Karger AG, Basel. Medical And Scientific Publishers). Modelling and Understanding Functional Interactions in Life Sciences. (2000 – present).

6.- PUBLICATIONS:

1. Periodic behavior of generalized threshold functions, in Discrete Math., 30, 1980 (with J. Olivos).
2. Comportement itératif des fonctions a multiseuil, in Inf. and Control, 45, 1980 (with J. Olivos).
3. Iterations des fonctions á seuil sur un graphe, in Actes Coll. Cerisy, 'Regards sur la Théorie des Graphes', Presses Pol. Romandes, 1980 (with J. Olivos).
4. Etude dynamique des certains modèles de controle génétique, in Journal de Biometrie et Génétique, J.M. Legay et. al. eds., 1980 (with Snoussi E.).
5. Comportement periodique des fonctions á seuil binaires, in Disc. Applied Math 3, 1981 (with J.Olivos).
6. The convergence of symmetric threshold automata, in Inf. and Control, Vol. 51, Nov. 1981 (with J.Olivos).
7. A Short proof on the cyclic behaviour of multithreshold symmetric automata, in Inf. and Control, Vol. 51. 1981, pp. 95-97 (with S. Martínez).
8. Sequential iteration of threshold functions, numerical method in the study of critical phenomena, Deladora et. Al. eds., Springer Series in Synergetics, pp. 64-70, Springer Verlag, 1981.
9. Fixed point of threshold functions on a finite set, in SIAM Journal on Algebraic and Discrete Vol. 3. No. 4. 1982.
10. Specific roles of different Boolean mappings in random networks, in Bull. of Math. Biol., Vol. 44, 1982 (with F. Fogelman, G. Weisbuch)
11. Iterative behaviour of generalized majority functions, in Math.Social Sciences, 4, 1983 (with M.Tchuente).
12. Transient length in sequential iterations of threshold functions, in Disc. Applied Maths., 6, 1983 (with F.Fogelman, G.Weisbuch).
13. Iterative behavior of one dimensional threshold automata, in Disc. Applied Maths., 8, 1984 (with M.Tchuente).
14. Dynamique d'un automata a mémoire modélisant le fonctionnement d'un neurone, Comptes Rendues Acad. Sciences France, t299, Série I, No. 10, 1984 (with M. Cosnard, presented by R.Thom).
15. Dynamical behavior of neural networks, in SIAM Journal on Alg.and Disc. Meths., Vol. 6, No. 4, 1985.
16. Erasing multithreshold automata in Dynamical Systems and Cellular Automata, Demongeot et. al. Eds., Acad. Press 1985. pp. 47-55 (with M. Tchuente).
17. Dynamics on positive automata networks, in Theoretical Computer Sciences, 41 pp. 19-32, 1985.

18. Comportement dynamique d'un automate á mémoire, in Actes Coll. Biol. Théorique, Solignac, Eds. CNRS. 1985 (with M. Cosnard).
19. The energy as a tool for the study of threshold networks, in Discrete Applied Maths., 12, pp 261-277, 1985 (with F. Fogelman,
20. Dynamical properties of an automaton with memory, in Procc. Of "Disordered systems and Biol. Organization" Biennestock et. al. eds. (with M. Cosnard) NATO, ASI series in Computer and Systems Science. Vol. 20, Springer Verlag, pp. 63-66, 1986.
21. Positive automata networks, invited paper, in The Winter School Disordered Systems and Biological Organization at Les Houches, Biennestock et. al. eds., NATO Series in Computer Sciences, Vol. 20, Springer Verlag, pp. 101-112, 1986.
22. Knowledge representation by automata networks, in Computers and Computing, P. Chenin et. al. eds., Wiley-Masson, 175-180, 1986 (with F. Fogelman).
23. Invariants in automata networks, in J. Phys. A. Math. Gen., 19 L961-L965, 1986 (with G. Vichniac).
24. Lyapunov functions for parallel neural networks, R.R. M.I.T. Lab. for Computer Sciences, in 'Neural Networks for Computing', J.S. Denker ed. Am. Inst. Phys., 165-181, 1986 (with G. Vichniac).
25. Antisymmetrical neural networks, in Discrete Applied Maths., 13, 97-100, 1986.
26. Performance of an asynchronous pipeline array of automata, in Math. Soc. Sci., 14, 39-49, 1987 (with Shako, M. Tchunte).
27. The $3x + 1$ problem: A quasi cellular automaton, in Complex Systems, 1, 349-30, 1987 (with G. Vichniac).
28. Properties on positive functions and the dynamics of associated automata networks, in Discrete Applied Maths., 18, 39-46, 1987 (with S. Martínez).
29. Lyapunov functions associated to automata networks, Chapter of the book Automata Networks and Applications, Manchester Univ. Press, Non Linear Systems Series, pp. 58-81 (F. Fogelman et. al.eds.), 1987.
30. Threshold networks and generalisations, invited paper, in Procc. de la 17ème Ecole Francaise de Informatique - Theorique, Lectures Notes in Computer Sciences, No.316, C. Choffrut ed., Springer-Verlag, 1987.
31. Analysis of Marr-Poggio's stereo algorithm, in Procc. Cognitiva 87, CESTA eds. Paris, 401-404, 1987 (with E. Sepúlveda).
32. Difurcation structure of a discrete neuronal equation, in Disc. Applied Maths, 21, 21-34, 1988 (with M. Cosnard, D. Moumida).
33. Dynamical behaviour of a neural automaton with memory, in Complex Systems, 2, 161-176, 1988 (with M. Cosnard, D. Moumida, T. de Saint Pierre).
34. Decreasing energy functions and lengths of transients for some cellular automata, in Complex Systems, 2,5 501-508. 1988 (with A.M. Odlyzko).
35. Redes de autómatas, dinámica y aplicaciones, in Rev. Mat. Apl., 77-89, 1988.
36. The one-distribution of Gibbs states on Bhet lattice are probability vectors of period ≤ 2 for a nonlinear transformation in J. of Statistical Physics, Vol. 52, No. 1/2, 267-285, 1988 (with S. Martínez).
37. Dynamical neural schema for quadratic optimization problems, in Procc. of the INNS Meeting, Boston, 1998, in Networks, Vol. 1, 96, 1988 (with G. Hernández, M. Matamala).
38. Periodic behaviour of one and two dimensional neural networks, in Procc. of the INNS Meeting, Boston, 1988, in Neural networks, Vol. 1,97, 1988.
39. Cellular automata, dynamical and complexity, in Procc. Workshop Cellular Automata Modeling of Complex Physical Systems, Les Houches, Manneville et. al. eds., Procc. in Physics 46, Springer-Verlag, 1989.
40. Potts model automata networks, in Instabilities and Nonequilibrium Structures II, pp. 89-96, Tirapegui E. and Villarroel eds, D. Reidel Publ- 1989.
41. Complexity and Dynamics of neural networks, in Disordered Systems and Biological Models, World Scientific L. Peliti ed., 1-21. 1989.
42. Cellular automata, dynamics and complexity, in Cellular Automata Applications in Physical Chemistry R. Dagonnier et. al. eds., Mons University, Belgium, June 1989.
43. Energy functions in neural networks with continuous local functions, in Complex System, Vol. 3, 269-293, 1989 (with F. Fogelman, S. Martínez, C. Mejia).
44. Energy and atractors in parallel Potts dynamics, in J. Phys. A: Math Gen. 1989 (with G. Vichniac).
45. Local graph transformation driven by Lyapunov functionals, in Complex Systems, Vol. 3, Number 2,173- 184, 1989.
46. Exponential transient classes of symmetric neural networks for synchronous and sequential updating, in Complex Systems, Vol 3, 6, 589-597, 1989 (with S. Martínez).

47. Neural networks dynamics, in Neurocomputing, F. Fogelman et. al. eds., NATO-ASI Series, Vol. 68, pp. 93-102, Springer Verlag, 1990.
48. Lyapunov functionals for automata networks defined by cyclically monotone functions, in SIAM J. on Discrete Math., Vol. 4, N° 2, pp. 200-206, 1991 (with S. Martínez).
49. Sand piles, combinatorial games and cellular automata, in Instabilities and Non Equilibrium Structures III. E. Tirapegui, ed., Kluwer Pub., Holland, pp. 101-121, 1991.
50. Sequential and parallel dynamics complexity in automata networks, in Rev. Mat. Aplic., 12, 103-106, 1991.
51. One dimensional sand piles, cellular automata and related models, in Procc. of Int. Conf. in Non-Linear Phenomena, Elsevier, P. Cordero et. al. eds., pp. 169-185, 1991 (with M.K.Kiwi).
52. Parallel chip firing games on graphs, in Theor. Comp. Sci., 92, 291-300, 1992 (with J. Bitar).
53. Sand pile automata, in Ann. Inst. Henri Poincaré, Vol. 56, N° 1, pp. 75-90, 1992. (with M. K. Kiwi).
54. Automata Networks and Optimization, in Information Processing letters 42, 339-343, (1992) (with S. Martinez).
55. Automata networks strategies for optimization problems, in Automata Networks, Dynamical Systems and Statistical Physics, pp. 65-87, Kluwer Pub., 1993 (with S. Martínez).
56. On the limit set of some universal cellular automata, in Theoretical Computer Sciences, 110, pp. 53-78, 1993 (with S. Martínez, A. Maass).
57. Local extremal rules and Potts automata, in instabilities and non equilibrium structures IV, E. Tirapegui et. al. (eds), Kluwer Pub., 1993 (with G. Hernández).
58. Extremal automata for image sharpening, pre-print HLRZ, Julich 1993, in Journal of Modern Physics C (with G. Hernández and H. Herrmann), 1993.
59. Lyapunov functionals associated to automata, in CA and Cooperative Systems, NATO-ASI Series, Springer-Verlag Vol. 396 pp. 203-210, Boccara et. al. eds., 1993.
60. Sand-Pile dynamics in a one dimensional bounded lattice, in CA and Cooperative Systems, NATO-ASI Series, Springer Verlag, Vol. 396. pp. 211-225, Boccara et. al. eds., 1993.
61. Computing complexity of symmetric quadratic neural networks, in Procc-ICANN'93, Int. Conf. Artif. Neural Networks, pp. 677, Springer Verlag (1993) (with M. Matamala).
62. Discrete-parallel sequential update of neural networks with adapting synapses, in Procc. IJCNN'93, International Joint Conf. Neural Networks, Vol. 3, pp. 2371-74 (1993).
63. Complexity of block-sequential update for symmetric neural networks, in Procc. IJCNN'93, Vol. 2, pp. 1469-72 (1993) (with M. Matamala).
64. Lyapunov operators to study the convergence of extremal automata, in Theor.Comp. Sci., 125, pp. 329-337 (1994).
65. Dynamical and complexity results for high order neural networks, Int.Journal of Neural Systems, Vol. 5(3), pp 241-252 (1994) (with M. Matamala).
66. No Polynomial bound for the period of the parallel chip firing game on graphs, Theor, Comp. Sci., 136, pp. 527-532 (1994) (with M.A. Kiwi, R. Ndoundam, M. Tchuente).
67. Energy functionals for neural networks, invited survey to the Handbook of Brain Theory and Neural Networks edited by M.A. Arbib, Bradford books, M.I.T.-Press, 1995.
68. Cyclic automata networks on finite graphs, Lecture Notes in Computer Science, 911, Springer-Verlag, R.Baeza-Yates et al eds., pp. 398-410 (1995) (with M. Matamala).
69. A characterization of the existence of energies for neural networks, in 22nd International Colloquium on Automata Languages and Programming, Lecture Notes in Computer Sciences, Springer-Verlag (1995) (with M. Cosnard).
70. On line coarse ore granulometric analyzer using neural networks, in Proc. of IJCNN, Paris, October 1995 (with R. Fernández, E. Viennet, R. Barrientos, M. Telias).
71. Reaction-diffusion automata: three states implies universality, in Theory of Computing Systems, 30, 223-229 (1997) (with M. Matamala).
72. Dynamics behavior of cyclic automata networks, in Disc. Appl. Maths. 77, 2, 161-184 (1997) (with M. Matamala).
73. Discrete State Neural Networks and Energies, in Neural Networks, Vol. 10, N°2, pp 327-34 (1997) (with M. Cosnard).
74. Symmetric discrete universal neural networks, Theor. Comp. Sci., 168, 405-416 (1996) (with M. Matamala).
75. Universality of the chip firing game on graphs, Res. Rep., LITP-U. Paris-VII, 1995, Theor. Comp. Sci., 172, pp 121-134, 1997 (with M. Margenstern).
76. Sand-pile as a universal computer, J. of Modern Phys. - C, 7(2) 113-122 (1996) (with M. Margenstern).
77. Source reversal and chip firing, in Theor. Comp. Sc., 233, pp. 287-295 (2000) (with E. Prisner).

78. Complexity of tile rotation problems, in *Theor. Comp. Sc.*, 188, pp. 129-159 (1997) (with I. Rapaport).
79. Uniform Simulations of Turing Machines by Cellular Automata, in *Cellular Automata and Complex Systems*, pp.23-36, Kluwer (1999) (with M. Matamala).
80. Tiling allowing rotations only, *Theor. Comp. Sci.* 218 (1999), 285-95 (with I. Rapaport).
81. Dynamical behavior of Kauffman networks with and-or gates, in *Biol. Systems*, Vol. 8 N° 2, pp. 151-175 (with G. Hernández), (2000).
82. The canonical folding, in *Procc of Int. Conf. on Mathematics and Design '98*, pp. 523-534. San Sebastian, Spain, 1998 (best paper award).
83. Simple lattice model with inertia for sand piles, in *Granular Matter*, 1, pp. 137-140 Springer Verlag (1998) (with G. González, H. Herrmann and S. Martínez).
84. Dynamical Properties of Min-Max networks, Vol. N° 6 467-473 *Int. Journal of Neural Systems* (with M. Matamala, P.Estévez). (2000)
85. A biological generator of prime numbers, in *Nonlinear Phenomena in Complex Systems Vol.*, 3, N°2, pp 208-213, (2000) (with M. Markus, M. Schick).
86. Sand Piles and order structure of integer partitions, to appear in *Discrete Applied Maths.*, (2001) (with M. Morvan. Ha Duong Phan).
87. Lattice structure and convergence of a game of cards, to appear in *Annals of Combinatorics* (2001) (with Ha Duong Phan, M. Morvan).
88. Classification of defects on wood boards based on neural networks and genetic selection of features, *IIIS World Multiconference on Systemics Cybernetics and Informatics*, (SCI'98), Orlando USA, July 1998., Vol. I, pp.624-629 (with P. Estévez, C. Pérez Caballero. G. Buliler).
89. The structure of Linear chip firing games and related models, to appear in *Theor. Comp. Science*, (2000) (with M. Morvan, H.D.Phan)
90. Shell structures with magic numbers of spheres in a swirled dish, *Phys. Review E.*, Vol. 60, N° 6, 7182-85 (with K. Kotter, M. Markus) (1999).
91. Tiling with bars under tomographic constraints, *Theoretical Computer Sciences* 290 (2003) 1317-29 (with I. Rapaport, Ch. Durr, E. Remila).
92. Complexity of Perceptron Recognition for a Class of Geometric Patterns, *Theoretical Computer Sciences*, 299, pp 65-79, (2003) (with J. Aracena).
93. Intermingled basins due to finite accuracy, *Phy. Rev. E*. Vol. 62, N° 1, pp 397-401, (2000) (with M. Schmick, M. Markus).
94. Complexity of Langton's Ant, *Discrete Applied Mathematics*. Vol. 117, Issue 1-3, pp. 41-50, (with A. Gajardo, A. Moreira). (2002)
95. Generalized Langton's Ant: Dynamical Behavior and Complexity, *STACS'2001 Lectures Notes in Comp. Sci.* 2010, pp.259-70. (with A. Gajardo, A. Moreira). (2001)
96. Dynamical Behavior and Complexity of Langton's Ant, in *Complexity*, Vol.6 ,N°4, pp 46-51 (2001), (with A. Moreira and A. Gajardo).
97. A note about Braess Paradox via local Distributed Algorithm bases on autonomous agents, send to *Transportation Science*, (2000), (with A. Jofré, J. Becerra).
98. Swirling granular solidlike clusters, *Phys. Rev. E* 61, 4069 (2000) (with M. Scherer, K. Koetter, M. Markus, and I. Rehberg).
99. Self-organization of interacting, round particles into symmetric or asymmetric aggregates", in: 'Symmetry 2000' (I. Hargittai & T. Laurent, eds.), Portland Press, London, pp 377-384, (2002) (with M. Markus, K. Koetter, M. Schmick and M. Grewe).
100. Prime number selection of cycles in a predator-prey model, *Complexity*, Vol. 6, N°4, 33-38, (2001) . (with M. Markus).
101. Cicadas showing up every prime number of years, *The Math. Intelligencer*, Vol.24, N°1, pp.30-32 (with M. Markus). (2002).
102. Prey population cycles are stable in an evolutionary model if and only if their periods are prime, *Science Asia* 28 (2002): 199 - 203 (with M. Markus, O. Schulz).
103. Universal Cellular Automaton Over a Hexagonal Tiling with 3 States. *International Journal of Algebra and Computation*, Vol. 11 (3), pp 335-354. (2001). (A.Gajardo)
104. About the Dynamics of Some Systems Based on Integer Partitions and Compositions (Eric Goles, Michel Morvan and Ha Duong Phan). LNCS issue, proceedings of FPSAC2000. 214-225. 12 pages.

105. Sand piles models and discrete ordered structures. (Eric Goles, Michel Morvan and Ha Duong Phan). In International Conference of Combinatorics and Physics, Los Alamos, New Mexico, August, USA, 1998. 11 pages.
106. Positive and Negative Circuits in Discrete Neural Networks, in IEEE Transactions on Neural Networks 15 (1), pp 77-83, (2004) (with J.Aracena, J.Demongeot).
107. On limit Cycles of Monotone Functions with Symmetric Connection Graph, in Theoretical Computer Science , vol. 323, number 2, pp. 231-244 (with J.Aracena, J.Demongeot). (2004).
108. Fixed Points and Maximal independent sets on AND-OR Networks, in Discrete. Appl. Math. 138 (3), pp 277-288,(with J.Aracena, J.Demongeot). (2004)
109. Genetic Input Selection to a Neural Classifier for Defect Classification of Radiata Pine Boards, Forest Products Journal, Vol. 53, No. 7/8, July/August 2003, pp. 87-94.
110. On - off intermittency and intermingled-like basins in a granular medium, in Phys. Rev. E., 66, 0606214/1-4 (2002) (with M. Markus, M. Schmick).
111. Frieze-generation using artificial life, in 'Isama-Bridges'. (Ed. by J. Barrallo, N. Friedman, R. Sarhangi, C. Séquin, J. Martínez and J.A. Maldonado), 151-160, University of Granada (2003). (with M .Markus, D. Fischer). (2003).
112. Folding and Tiling, in Teor.Comp. Sci. Vol. 322, number 2, pp. 285 – 296 (2004).
113. Control of Turbulence: determination of the minimum pinning distance from the spatial measure entropy, in European Physics Journal D 33, 279-283. (with A. Greilich and M. Markus). (2005).
114. Dynamics of a class of ants in a one dimensional lattice in Theoretical Computer Science, vol. 322, number 2, pp. 267-283. (with A. Gajardo). (2004).
115. On conservative and monotone one-dimensional cellular automata and their particle representation, Theoretical Computer Science Vol. 325, N°2, pp 285-316) . (with A. Moreira, N.Boccaro). 2004.
- 116.- San Piles Models and lattices: a comprehensive survey, Theor. Comp. Science, vol. 322, number 2, pp. 383-407 (with M. Latapy, C. Magnier, M.Morvan, H,D. Phan). (2004).
117. On the update of the closure of a Chilean Institute, letter to SCIENCE, Vol. 309 Issue. 5736, p. 875. 2005, (with Y. Provoste).
118. Emergence of Prime Numbers as the Result of Evolutionary. Physical Review Letters, (Note) PRL 95, 22980. (with M.Markus). (2005).
119. Tracks Emerging by Forcing Langton's Ant with binary sequences, in Complexity 11,27-32, (with M.Schmick, M. Markus). (2006).
120. Hierarchy of Cellular Automata in relation to control or anti- control, in Complexus Mundi: Emergent patterns in nature, Miroslav M. Novak ed., pp 297-304 World Scientific (2006) (with M.Markus and M. Schmick)
121. Crossing Information in Two Dimensional Sanpiles, Theor. Comp. Science. 369,(1-3) 463-469, (2006), (with A.Gajardo).
122. Cellular Automata, Circuit Complexity, Universality and related topics., Invited chapter for the 60's birthday of G. Chaitin, World Scientific, C. Calude (ed), 2007, with A Gajardo.
123. L'arrêt impossible, Procc. Colloque de Cerisy, in "Déterminismes et complexités: autour de Henri Atlan", Recherches, La découverte, pp 77- 82, P. Bourguine et al eds, Paris ,2008.
124. A discrete mathematical model applied to Genetic Regulation and Metabolic Networks. J. of Microbiology and Biotechnology. (with Asenjo, J.A., Ramirez. P., Rapaport, I., Aracena, J., Goles E., and Andrews, B.A.), 17(3), 496-510 (2007)
125. Comparison between parallel and serial dynamics of boolean networks, in Theor. Comp. Sciences 347-53 (2008), (with L. Salinas).
126. Understanding a non trivial CA by finding simplest underlying communication protocols, in Lectures Notes in Computer Sciences, 5369, 2008 Springer-Verlag, with I Rapaport, C. Little.
127. Covering by squares, in TCS 396, 10-27 (2008), with L.Salinas.
128. Dynamical Complexity in cognitive neural networks, (2007) Biological Research 40:381-384 Biol. Research, 2008, with A. Palacios.
129. On the robustness of update schedules in boolean networks, in BioSystems, 97, 2009, 1-9, with J.Aracena, A. Moreira, L.Salinas.
130. Sequential Operator for filtering cycles in boolean networks, accepted in Advance in Applied Mathematics, August 2009,with L. Salinas
131. Loss of linearity and symmetrisation in regulatory networks, to appear in Procc of AINA-IEEE workshop, Bradford, UK, May 2009, with J. Demongeot, S. Sené.
132. Maximisation of granular outflow by oblique exits and by obstacles, in Physics of Fluids 21, 031701, Amer Inst of Physics, 2009, with B. Zelinski, M Markus.

- 133- communication Complexity and Intrinsic Universality in Cellular Automata. Submitted to Theoretical Computer Sciences (may 2009), with P.E. Meunier, I Rapaport, G. Theyssier
- 134- Traced communication complexity of cellular automata, accepted in Automata2009, Sao Paulo, Brasil, October 2009, with Pierre Guillon and Ivan Rapaport.

7.-BOOKS:

- 1.- Neural and Automata Networks: Dynamical Behaviour and its Applications, Serie: Mathematics and Its Applications, Kluwer Pub. Co., 250 pp, Marzo 1990 (first edition), 1991 (second edition) (prize M. Montt) (with S. Martínez).
- 2.- Algebra, Ed. Pedagógicas (Chile), 450 pp. (1993). Also edited as textbook at the School of Engineering, U. of Chile, 1990. It is the official text at our school (from 1990) and it is also used in several national universities.

8.- EDITED BOOKS:

- 1.- Codificación de Sistemas Dinámicos y Redes de Automátas, Proceedings Congreso Franco-Chileno de Matemáticas Aplicadas, Rev. Mat. Apl., Vol. 9, 2, 1988. (with S. Martínez).
- 2.- Proceedings Second Workshop on Disordered Systems and Biological Models, Rev. Mat. Apl., 1991 (With S. Martínez).
- 3.- Dynamical Systems and Cellular Automata, 400 pp., Academic Press, 1985 (with J. Demongeot, M. Tchuente).
- 4.- Automata Networks, Dynamics Systems and Statistical Physics, 250 pp., Kluwer Pub., 1992 (with S.Martínez).
- 5.- Cellular Automata and Cooperative Systems, 546 pp., NATO-ASI Series, Vol. 396, Kluwer Pub., 1993 (with N. Boccara, S. Martínez, P. Picco).
- 6.- Cellular Automata, Dynamical Systems and Neural Networks, Procc. III-Summer School FIESTA 92, Vol. 282. Maths. and Its Applications, Kluwer Pub. (with S. Martínez).
- 7.- Theoretical Informatics, Proc. of LATIN'95, Lecture Notes in Computer Science, 911, 523 p. (1995) (with R. Baeza-Yates, P.V. Pobleto).
- 8.- Dynamics of Complex Interacting Systems, Kluwer, 1996, 177 p. (co-ed. S. Martínez).
- 9.- Cellular Automata and Complex Systems, Kluwer, 1997 (co-ed. S. Martínez).
- 10.- Complex Systems, Kluwer, 300 p. 2001 (co-ed. S. Martínez).

9.- TUTOR ADVISER: 32 under and postgraduate students.

10.- **PRINCIPAL GRANTS:** about 30 grants from Chilean and international sources

11.- PRINCIPAL RESEARCH POSITIONS AND/OR INVITED PROFESSOR:

Laboratoire des Circuits Logiques, Univ. Libre de Bruxelles , Biophysics Laboratory, Univ. of Jerusalem, Inst. Blaise Pascal LITP, Univ. Paris VII (1981, 83, 93). Ecole Polytechnique and CESTA-Paris, Univ. de Grenoble, Université de Bordeaux , M.I.T. Laboratory for Computer Science, USA, Univ. de Montreal, Univ. of Sao Paul Bell Laboratories, Murray Hill, U.S.A., Univ. of Cataluña, Barcelona, Univ. of Paris V (1989), Ecole Normale Supérieure de Lyon , IMPA, Ríó de Janeiro, ISI- Turin, Univ. of Memphis, U.S.A., Univ. of Yaunde, Cameroon, Université d'Orsay, Institute for Complex Systems, Santa Fe- USA, Politechnical . Institute, Torino, École des Hautes Études en Sciences Sociales.

12.- ORGANIZATION OF MEETINGS AND CONGRESS: More than 20 activities at international level in the last 20 years

13.- **PRINCIPAL INTERNATIONAL INVITED LECTURES : About 60. Last one as invited speaker in a plenary talk in the European Conference on Complex Systems (Oxford – England)**

14.- **ADMINISTRATIVE CHARGES: Several ones. One of the most important: director of CONICYT (the Chilean agency for Science and Technology, between 200-2005.**

15.- ACTIVITIES OF SCIENTIFIC PROMOTION AND DISSEMINATION:

1. Talks in Universities and high schools as well as a **radio program** (RADIO CHILENA: 5 minutes each and three times by week during two years) talking about specific scientific or technological news)
2. **Open TV.** Conduction of a one hour prime-time program (about 40 programs) on the state Chilean television (TVN) about scientific and technological topics (1996 - up today). This program has been very successful with 15 rating points (one point is about 70.000 people) and an excellent critique in Chilean journals and Newspapers. Also, it has been awarded among the best tree cultural programs in Chile (APES-97), and at international level in Prix IAMS to the best scientific documentary, Tele-Science, Montreal - Canada. Also it is a comment program in TV Culture, Brazilian open TV. The program won the prestigious **UNESCO-CNRS Prize Jules Verne.** (Paris, 2004).

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