

CURRICULUM VITAE
Jorge Soto-Andrade

Personal Data:

Born July 9, 1945, in Santiago, Chile

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Education:

1. Licenciado en Ciencias, Mención Matemáticas (Master in Maths), University of Chile, Santiago, Chile, 1967.
2. Docteur de Troisième Cycle en Math. Pures, Université de Strasbourg, France, 1970.
3. Docteur d'Etat ès Sciences Mathématiques, Université de Paris 11, France, 1975.

Positions Held:

1. Centre National de la Recherche Scientifique, France, Attaché de Recherche, 1972-1975.
2. University of Chile, Full Professor, 1975 - present.

Honors:

Alexander von Humboldt Fellow, 1979–80

Addresses, Communicatios and Participations (selection):

- AMS Symposium on Representation Theory of Finite Groups, Arcata, USA, July 1986 (Invited Address)
- Période Spéciale sur les Orbites Unipotentes et Représentations, Université de Paris 7, Juin-Juillet 1987 (Invited Address).
- Third Workshop in Representation Theory of Lie Groups and Applications, Córdoba, Argentine, August-September 1989 (Invited Address).
- Ecole CIMPA sur la K -Théorie, l'algèbre homologique et les représentations des groupes, Mendoza, Argentine, July 1996 (Invited Address).
- Colloque sur les méthodes homologiques et les représentations des groupes, CIRM, Marseille-Luminy, France, June 30 - July 4, 1997 (Invited participation).
- International Congress of Mathematicians, Berlin, August 18 - 27, 1998 (Communication on Gelfand Models, Weil Representations and Twisted Spherical Functions),
- Arithmetic Geometry and Number Theory, Conference to Honor N. Katz, Princeton University, Mathematics Department, December 11–14, 2003 (Invited Participation)

Current research grants:

1. Fondecyt (National Science and Technology Fund, Chile), Research Project 1040444: “Geometric and Tensor Gelfand Models in Group Representation Theory”, 2004-2006
2. International Cooperation Fondecyt Research Project 7040148 (same title) 2004.
3. Projet International de Coopérati3n Scientifique (PICS) 1514, “Méthodes Homologiques en représentations et algèbres de Hopf”, 2002-2004, CNRS, France (Chilean Coordinator)

Other research related activities:

Reviewer: Mathematical Reviews

Referee: Finite Fields and its Applications, Beiträge über Algebra u. Geometrie, Communications n Algebra, J. of Algebra.

Research publications:

1. "Harmoniques sphériques sur un corps fini", C. R. Acad. Sc. Paris, 272 (1971), 1642-1645.
2. "Représentation de Weil de $\mathrm{GSp}(4, F_q)$ associée à un espace quadratique de dimension 4 sur F_q ", C. R. Acad. Sc. Paris, 278 (1974), 227-230.
3. "La représentation de Weil de $\mathrm{GSp}(4, F_q)$ et les représentations de $\mathrm{Sp}(4, F_q)$ ", C. R. Acad. Sc. Paris 278 (1974), 321-324.
4. "Construction géométrique de certaines séries discrètes", in Geometry and Topology, Lecture Notes in Math., Vol. 597, p. 32-55, Springer-Verlag, 1977, Berlin-Heidelberg-New York.
5. "Représentations de certains groupes symplectiques finis", Mém. 55-56 (1978), 334 p., Soc. Math. France.
6. "La transformation de Shintani et les caractères de $\mathrm{SL}(n, F_q)$ ", C. R. Acad. Sc. Paris, 289 (1979), 269-232.
7. "Barnes' Identities and the Representations of GL_2 ", J. reine u. angew. Math., 344 (1983), 269-272 (with W. Li).
8. "Self reference and fixed points", Acta Appl. Math., 2(1984), 1-19 (with F. J. Varela).
9. "Harmoniques sphériques sur un corps fini", Notas Soc. Mat. Chile., 3 (1984), 49-82.
10. "Sur la construction des représentations des groupes classiques", in "Analysis, Geometry and Probability", M. Dekker, New-York, 1985, 121-146. Lecture Notes}
11. "Caractères et mouvements browniens sur les espaces de Gel'fand discrets", Actes des Journées "Probabilités sur les structures géométriques", Publ. Labo. Proba. et Stat., Univ. Paul Sabatier, Toulouse, 1985, 115-140.
12. "En torno a las funciones esféricas (caso finito)", Notas Soc. Mat. Chile, 4(1985), 71-94.
13. "Fonctions sphériques et modèles de Gel'fand pour le groupe de mouvements rigides d'un espace euclidien sur un corps local", C. R. Acad. Sc. Paris, Série I, 302 (1986), 463-466 (joint with J. Pantoja).
14. "Geometrical Gel'fand Models, Tensor Quotients and Weil Representations", Proc. Symp. Pure Math., 47 (1987), Amer. Math. Soc., 305-316.
15. "Groupes de Grassmann-Heisenberg et représentations de Weil généralisées pour SL_n , n pair", Astérisque, 168(1988), 167-190 (with J. Pantoja).
16. "Structure of generalized local rigid motion groups", Proc. Amer. Math. Soc., 104 (1988), 693-696 (joint with J. Pantoja).
17. "Harmonic Analysis of Random Walks on the Daisy Library Graph", in "Harmonic Analysis and Discrete Potential Theory", M. Picardello, Ed., Plenum, New York, 1992, 223-232.
18. "On mental rotations and cortical activity patterns", Biol. Cybern., 64(1992), 221-223 (with F. J. Varela)
19. "Generalized Weil representations for $\mathrm{SL}(n, k)$ n odd, k a finite field", in "New Developments in Lie Theory and their Applications", J. A. Tirao and N. Wallach, Editors, Birkhäuser-Verlag, Boston, 1992 (joint with J. Pantoja).
20. "Représentations de Weil de $\mathrm{SL}_*(2, A)$ et $\mathrm{SL}(2, q)$ ", C. R. Acad. Sci. Paris, t. 232 (1996), Série I, p. 1109-1112 (with J. Pantoja).
21. "Intertwining Operators for $L^2(E)$ ", Comm. in Algebra 26(1998), p. 1419-1427 (with J. Vargas).
22. "Analyse harmonique sur le demi-plan de Poincaré fini tordu", C. R. Acad. Sc. Paris, t. 328, Série I (1999), p. 375-380 (with J. Vargas).
23. "Twisted spherical functions on the finite Poincaré Upper Half Plane", J. Algebra 248 (2002), 724-746 (with J. Vargas)
24. "A Bruhat decomposition of the group $\mathrm{SL}_*(2; A)$ ", J. Algebra, 262 (2002), 401-412 (with J. Pantoja)
25. "Anticipatory Computing with Autopoietic and (M, R) Systems" en *Soft Computing Systems: Design, Management and Applications*, A. Abraham et al. (Eds.), IOS Press, 2002, Amsterdam, Berlin, (with J. C. Letelier, G. Marín, J. Mpodozis)
26. "Metabolic Closure in (M, R) Systems", to appear in Proc. of the Ninth International Conference on the Simulation and Synthesis of Living Systems (ALIFE 9), Boston, September 12-15th, 2004, MIT Press, Boston, (with J. C. Letelier, F. Guíñez-Abarzúa, A. Cornish-Bowden, M. L. Cárdenas)

27. "Tensor products of irreducible representations of $GL(3,k)$ ", submitted to Forum Math. (2003) (with L. Aburto-Hagueman y J. Pantoja).

Selected citations:

1. Katz, Nicholas, "Estimates for Soto-Andrade sums". J. Reine Angew. Math. 438 (1993), 143--161.
2. Kuang, Jing Hua A note on Weil representation of $SL(2,q)$ and Soto-Andrade sums. Finite fields: theory, applications, and algorithms (Las Vegas, NV, 1993), 207--212, Contemp. Math., 168, Amer. Math. Soc., Providence, RI, 1994.
3. Chen, Imin, "Elementary estimates for a certain type of Soto-Andrade sum". Proc. Amer. Math. Soc. 128 (2000), no. 7, 1933--1939.
4. Kable, Anthony C., "Legendre sums, Soto-Andrade sums and Kloosterman sums". Pacific J. Math. 206 (2002), no. 1, 139--157

Publications generated by thesis directed:

1. Gonzalez-Lorca, J., "Descente de Shintani pour $GL(2, q)$ ", C. R. Acad. Sc. Paris, Série I, 313 (1991), 197-199 (M. Sc. Minor Thesis, Univ. of Chile).
2. Juyumaya, J., "Représentation du groupe symétrique par des opérateurs de Fourier-Grassmann", C. R. Acad. Sc. Paris, Serie I, 315 (1992), 755-758 (Ph. D. Thesis, Univ. of Chile).
3. Juyumaya J., "Operateurs de type Fourier-Grassmann sur $\mathbf{1}_U^{GL(n,q)}$ ", J. of Algebra, 185 (1996), P. 796-819 (revised and extended version of a Ph. D. Thesis, Univ. of Chile).
4. Prado, H., "Représentations de $GL(2, R)$ et identités de type Barnes pour la fonction Gamma", C. R. Acad. Sc. Paris, Série I, { 300 } (1985), 97-100 (M. Sc. Minor Thesis, Univ. of Chile).
5. Prado, H., "Reduced Weil models for representations of $GL(2, R)$ and Barnes' lemma", J. London Math. Soc.(2) 55 (1997) 159-169 (revised version of a M. Sc. Minor Thesis, Univ. of Chile).
6. Yañez, M. F., "A Weakly Geometrical Gel'fand Models for $GL(n,q)$ and a Realization of the Gel'fand Character of a Finite Group", C.R.Acad.Sc. Paris, 316, Serie I, (1993) 1149-1154 (Ph. D. Thesis, Univ. of Chile).

Educational publications (selection).

1. "Paseos al azar: entre la geometría y el análisis", Notes for Summer Workshop for Math. Teachers, 11 p., Fundación Olimpiada Matemática Argentina, Paraná, Entre Ríos, Argentina, January 1998.
2. "Al azar del cara o sello: Introducción al Cálculo de Probabilidades", Probability Module for Teacher's Workgroups, 86 p., Ministry of Education, Santiago, 2000.
3. "Matemática Activa 3° Medio", Student textbook, Ministry of Education, Editorial Marenostrum, 320 p., Santiago, 2004 (with P. González).
4. "Matemáticas Activas 1° Medio", 256 p., Student textbook, Ministry of Education, Editorial Marenostrum, Santiago, 2002 (with R. Bamón y P. González).
5. "Matemática Activa 2° Medio", 256 p., Student textbook, Ministry of Education, Editorial Marenostrum, Santiago, 2004 (with R. Bamón y P. González).
6. "Matemáticas Activas 4° Medio", Student textbook, Ministry of Education, Editorial Marenostrum, Santiago, 2002, 256 p. (with R. Bamón y P. González)

Publications update 2006,

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J.-C. Letelier, J. Soto-Andrade, F. Guíñez Abarzúa, A. Cornish-Bowden & M. L. Cárdenas (2006) Organizational invariance and metabolic closure: analysis in terms of (M,R) systems J. Theor. Biol. 238, 949–961

Metabolic closure in (M, R) Systems

A. Cornish-Bowden, M. L. Cárdenas, J.C. Letelier, J. Soto-Andrade, F. Guíñez Abarzúa, ... - Artificial Life IX. MIT Press, Cambridge, Massachusetts, 2004

A. Cornish-Bowden, M. L. Cárdenas, J.-C. Letelier, J. Soto-Andrade & F. Guíñez Abarzúa (2004)
Understanding the parts in terms of the whole, *Biol. Cell.* 96, 713–717

J.-C. Letelier, J. Soto-Andrade, F. Guíñez Abarzúa, A. Cornish-Bowden & M. L. Cárdenas, (2004)
Metabolic closure in (M,R) systems in *Artificial Life IX* (ed. J. Pollack, M. Bedau, P. Husbands, T. Ikegami, R. A. Watson) MIT Press, Cambridge, Massachusetts, pp. 255–263.

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Un monde dans un grain de sable: Métaphores et analogies dans l'apprentissage des mathématiques,
Annales de Didactique et de Sciences Cognitive, 2006 (11), pp 123-147