

CURRICULUM VITAE

September 15, 2008

Name: JUAN ANTONIO GATICA

Personal Data: Born October 16, 1945, Temuco, Cautín, Chile, Married.

Visa Status: Permanent Resident of the United States

Education: Licenciado en Matemática, Universidad de Concepción (Chile), 1969; Ph.D., University of Iowa, 1972.

Professional Experience: Instructor, Universidad de Concepción, 1968-71, Instructor, University of Iowa, 1971-72, Profesor Asistente, Universidad de Concepción, 1972-73, Profesor Titular, Universidad de Concepción, 1973-78, Professor Titular, Universidad Técnica del Estado (Chile), 1974- 78, Visiting Assistant Professor, University of Iowa, 1975-78, Assistant Professor, University of Iowa, 1978-79, Associate Professor, University of Iowa, 1979-90, Visiting Associate Professor, Emory University, 1986-88, Professor, University of Iowa, 1990-Present, Director of the Mathematics Tutorial Laboratory, Department of Mathematics, University of Iowa, June 2000-Present.

Technical Areas of Interest: Ordinary Differential Equations, Fixed Point Theory, Applications to Biology.

Member of: American Mathematical Society, SACNAS, the Society for Advancement of Chicanos and Native Americans in Science. *

Publications: Research Articles: Note: a (R) after an article means it was refereed, while (C) means contributed, not refereed.

1. Fixed point theorems for Lipschitzian pseudo-contractive mappings, Proc. A.M.S. 36 (1972), 111-115 (with W.A. Kirk) (R).
2. Fixed point theorems for contraction mappings with applications to nonexpansive and pseudo-contractive mappings, Rocky Mountain J. of Math. 4 (1974), 69-79 (with W.A. Kirk) (R).
3. Fixed Point Theorems for k-set contractions defined in a cone, Pacific J. of Mathematics, 53(1974), 131-136 (with W.A. Kirk) (R).
4. Fixed point theorems for k-set contractions and pseudo- contractive mappings, J.M.A.A. 46 (1974), 555-564 (R).
5. Fixed point theorems in a cone with applications, J.M.A.A., 61 (1976), 58-71 (with Hal L. Smith) (R).
6. A singular functional differential equation arising in an immunological model, Proceedings of the Conference on the Theory of Ordinary and Partial Differential Equations, 1976, Springer-Verlag Lecture Notes in Mathematics, Vol. 564 (with Paul Waltman) (C).

7. A threshold model simulating the humoral immune response to a replicating antigen, *Math. Biosc.* 37 (1977),113-134 (with H.I. Freedman) (R). 8.
8. On the boundedness of lymphocytes in deterministic threshold models of humoral immune response, *Rocky Mountain J. of Math.* 9 (1979), 73-81 (with H.I. Freedman)(R).
9. Fixed point theorems for mappings in ordered Banach spaces, *J.M.A.A.* 71 (1979), 547-557 (with N.P. Cac) (R).
10. A threshold model of antigen-antibody dynamics, *Proc. 1978 IEEE Conference on Decision and Control*, 746-749 (with Paul Waltman) (C).
11. A threshold model of antigen-antibody dynamics with fading memory, *Proc. Int. Conf. on Nonlinear Analysis*, V. Lakshimikantham, Editor, Academic Press (1982), 425-439 (with Paul Waltman) (C).
12. Existence and uniqueness of solutions of a functional differential equation modeling thresholds, *Journal of Nonlinear Analysis, T.M.A.*, 8, (1984), 1215-1222 (with Paul Waltman) (R).
13. Predator-prey models with almost periodic coefficients, *Applicable Analysis* 27 (1988), 143-152 (with Joseph W.H. So) (R).
14. A system of functional differential equations modeling threshold phenomena, *Applicable Analysis* 28 (1988), 39-50 (with Paul Waltman) (R).
15. Iterative procedures for nonlinear second order boundary value problems, *Annali di Matematica Pura ed Applicata (IV) (CLVH)* (1990), 1-25 (with Vladimir Olikier and Paul Waltman) (R).
16. Singular nonlinear boundary value problems for second order differential equations, *J.D.E.* 79 (1989), 62-78 (with Vladimir Olikier and Paul Waltman) (R).
17. Radially symmetric solutions of a class of singular elliptic equations, *Proc. Edinburgh Math. Soc.* 33 (1990),169-180 (with Gaston E. Hernandez and Paul Waltman) (R).
18. Positive almost periodic solutions of some delay integral equations, *J.D.E.* 83 (1990) (with A.M. Fink) (R).
19. For every answer there are two questions, *Mathematics Magazine* 65(1992), 182-185 (with A.M. Fink) (R).
20. Approximation of solutions of singular second order boundary value problems, *SIAM J. Math. An.* 22 (1991), 440-462, (with A.M. Fink, Gaston E. Hernandez and Paul Waltman) (R).
21. Qualitative behavior of solutions of some state dependent delay equations, *Delay and Differential Equations, Proceedings in Honor of George Seifert on his Retirement*, 36-56, World Scientific (1992) (with Jesus Rivero) (C).
22. Eigenvalues of generalized Gelfand problems, *Journal of Nonlinear Analysis, T.M.A.* 20 (1993), 1453-1468 (with A. M. Fink, and Gaston E. Hernandez) (R).
23. Positive solutions of systems of second order boundary value problems, *J.M.A.A.* 180(1993), 93-108 (with A. M. Fink) (R).
24. Nonnegative solutions to the radial Laplacian with nonlinearity that changes sign, *Proc. A.M.S.* 123 (1995), 1393- 1398 (with N. P. Cac and A. M. Fink) (R).
25. Nonnegative solutions of quasilinear elliptic problems with nonnegative coefficients, *Journal of Mathematical Analysis and Applications* 206 (1997), 1-9, (with N. P. Cac and A. M. Fink) (R).
26. Positive solutions of semilinear problems with coefficients that changes sign, *J. Nonlinear Analysis*, 37, (1999), 501-510, (with N. P. Cac and Y. Li) (R).

27. Teoremas de Punto Fijo con Aplicaciones a Ecuaciones Diferenciales, *Cubo Matemática Educacional*, Vol. 2(2000), 195-207 (R).

Research in Progress : 1. A fixed-point theorem in Fréchet spaces with applications, pre-print (With Rudolph Schmid).
2. Multiplicity of solutions of generalized Gelfand problems. 3. Bifurcation of positive almost periodic solutions of delay integral equations.
4. Behavior of solutions to state-dependent delay differential equations.
5. A model for the Immune System Using State-Dependent Functional Differential Equations (with E. Muñoz).
6. Existence of positive solutions to superlinear differential equations.

Books and Monographs: 1. *Variable Compleja*, Cuadernos del LAM, Santiago, Chile, 1975.
2. *Introducción a la integral de Lebesgue en la recta*, Programa de Monografías Científicas, Organización de Estados Americanos, 1977.
3. *Math for the Biological Sciences*, Kendall/Hunt, 2002.
4. *Calculus and Matrix Algebra for Business*, Kendall/Hunt, 2003.

Talks Since 1981. 1. 10th Midwest Conference on Differential Equations, North Dakota State University, October 1981. Title: On a singular differential equation.
2. First US. -Chile International Conference on Nonlinear Analysis and Differential Equations, Santiago, Chile, April 1985. Title: Existence and uniqueness of solutions to singular systems of functional differential equations.
3. Dixieland Analysis Seminar, Emory University, May 1987. Title: “ Iterative procedures for nonlinear second order boundary value problems.
4. Auburn University, February 1988. Title: Positive solutions to singular second order differential equations.
5. Wake Forest University, May 1988. Title: Positive solutions to singular second order ordinary differential equations.
6. University of Alberta, June 1988. Title: Positive solutions for singular nonlinear boundary value problems of second order differential equations.
7. University of Connecticut, March 1989. Title: Positive solutions of singular second order boundary value problems.
8. International Conference on Differential Equations: Theory and Applications in Stability and Control, Colorado Springs, Colorado, June 1989. Title: Approximation of solutions of singular second order boundary value problems.
9. Universidad de la Frontera, Temuco, Chile, November 1989. Title: Radially symmetric solutions of semilinear elliptic boundary value problems.
10. III Simposio Chileno de Matemática, Concepción, Chile, November 1989. Title: Positive almost periodic solutions of some delay differential equations.
11. Facultad de Ciencias, Universidad de Chile, Santiago, June 1990. Title: Positive solutions of systems of boundary value problems.
12. Seifert Conference, Iowa State University, Ames, Iowa, October 1991. Title: Qualitative behavior of solutions of some state dependent delay equations.

13. Special session on differential equations, Dayton Meeting of the A.M.S., October 1992. Title: Nonnegative solutions of quasilinear elliptic boundary value problems with nonnegative coefficients.
14. Georgia Institute of Technology, February 1993. Title: Nonnegative solutions of quasilinear elliptic boundary value problems.
15. Emory University, February 1993. Title: Nonnegative solutions of quasilinear boundary value problems.
16. Lakeland College, October 7, 1993. Title: Teaching Calculus with the aid of MAPLE.
17. MichMATYC 1993, Oakland Community College, Auburn Mills, Michigan, October 8, 1993. Title: Teaching Calculus with the aid of MAPLE.
18. Joint Mathematics Meeting, Cincinnati, Ohio, January 12, 1994, Special Session on Singular Boundary Value Problems. Title: Radially symmetric solutions of generalized Gelfand problems.
19. OhioMATYC Conference, Cincinnati, Ohio, February 18, 1994. Title: "How MAPLE can be used to teach Calculus.
20. University of Missouri, Rolla, Colloquium, Title: Nonnegative solutions of some quasilinear elliptic equations March II, 1994.
21. Universidad de la Frontera, Temuco, Chile. Colloquium, Title: Using MAPLE as an aid in the teaching of Calculus, August 24, 1994.
22. Universidad de Concepción, Chile, Colloquium, Some aspects of nonlinear functional analysis and applications to differential equations, August 31, 1994.
23. Colloquium Mathematicae Valparadisi, Nonnegative solutions of quasilinear elliptic boundary value problems with nonnegative coefficients, September 6, 1994.
24. Colloquium Mathematicae Valparadisi, On Using MAPLE as an aid in the teaching of calculus, September 7, 1994.
25. Santiago College, Colloquium, Using technology as an aid in the teaching of mathematics, September 13, 1994.
26. Facultad de Ciencias Universidad de Chile, Colloquium, Nonnegative solutions of quasilinear boundary value problems with coefficients that change sign, September 14, 1994.
27. Facultad de Ciencias, Universidad de Chile, Colloquium, Using MAPLE as an aid in the teaching of mathematics, September 15, 1994.
28. Facultad de Ciencias Físicas y Matemáticas, Universidad de Chile, Colloquium, What an average adult will need to know in mathematics in the near future, September 21, 1994.
29. Universidad de Concepción, Seminar, Nonlinear functional analysis and applications, October 1994.
30. Universidad de Concepción, Seminar, Teaching differential equations with the aid of MAPLE, October 1994.
31. Universidad de Puerto Rico, Mayaguez, Colloquium, Fixed point theorems and their applications to differential equations, 3/17/99.
32. Universidad de Puerto Rico, Cayey, Colloquium, Fixed point theorems and their applications to differential equations, 3/18/99.
33. XV SIDIM, Universidad de Puerto Rico, Mayaguez, Cálculo para las ciencias biológicas, 2/25/2000.
34. XV SIDIM, Universidad de Puerto Rico, Mayaguez, Problemas de valores de frontera para ecuaciones elípticas semilineales, 2/26/2000.

35. XVI SIDIM, Universidad de Puerto Rico, Humacao, "State-Dependent Functional Differential Equations", 2/22/2001.
36. Matemática aplicada, principal speaker, workshop on teaching mathematics for undergraduates, Universidad de Chile Santiago, 10/6/2002.
37. A simple model for the immune system, XVIII SIDIM, San German, 2/22/2003.
38. Applications of Calculus, principal talk, workshop on teaching calculus, University of Texas, San Antonio, 10/11/2003.
39. The Mathematics Tutorial Laboratory at The University of Iowa, invited talk, Universidad Católica de Ponce, Ponce, Puerto Rico, February 24, 2006.

Conferences Organized:

1. Midwest Conference on differential equations, September 1983.
2. Midwest Conference on Differential Equations, December 1992.

Professional Service:

1. Referee for Proc. A.M.S. J.M.A.A., SIAM J. Math An., Proc. Edinburgh Math Soc., Journal of Nonlinear Analysis, T.M.A., J.D.E., Proceedings, Academia Sinica, Rocky Mountain Journal of Mathematics.
2. Referee for grants from N.S.F., CONICYT, and FONDECIT.
3. Proposal Review Panel for Interdisciplinary Training of Undergraduates in Biological and Mathematical Sciences (UBM) (NSF Program Solicitation 08-510) Working Group, May 2008.

Special Service to the Department:

1. Chair of the Committee for Minority Recruitment and Development (2006-).

Departmental Committees: 1. Undergraduate Committee (1998-2000).

2. Salary Committee
3. Hiring committee
4. Graduate Committee
5. Hiring Plan Committee
6. Advisory Committee
7. Visiting Speaker Committee 8. T.A. Selection Committee
9. Executive Committee (1998-2000)
10. Executive Committee (2008-)
11. Teaching Evaluation Committee (2008-)

Courses Taught:

1. Elementary Algebra
2. Finite Mathematics
3. Introduction to Calculus
4. Mathematics for the biological sciences.
5. Calculus for the biological sciences.
6. Calculus (all courses for mathematics majors).
7. Calculus for Business.
8. Introduction to ordinary differential equations.
9. Intermediate Ordinary Differential Equations.
10. Theory of Ordinary Differential Equations.

11. Advanced Topics in Ordinary Differential Equations.
12. Real Analysis.
13. Complex Variables.
14. Measure Theory.
15. Functional Analysis.
16. Topics in complex variables (entire functions).
17. Partial differential equations.
18. Topology.
19. Algorithms.
20. Elementary Properties of Spaces and Functions.
21. Calculus of Several Variables for Engineers.
22. Ordinary Differential Equations for Engineers.

Contributions to Teaching:

1. Participated in the organization of a remedial course (22M: 1) in high school algebra to be taught in large lecture sections (1978).
2. Worked on the reorganization of 22M: 1 so as that it could be taught in small lectures by Teaching Assistants under faculty supervision (1992).
3. Participated in the introduction of the use of graphing calculators in our pre-calculus courses (1992-94).
4. Introduced MAPLE in the teaching of Calculus for the Biological Sciences (22M:016) (1994-95).
5. Have guided two Honors Projects (1993-95).
6. Was faculty advisor to the University of Iowa Chapter of the M.A.A. (1992- 94).
7. Restructured and was main selector of textbooks for Mathematics for the Biological Sciences (22M: 015) and Calculus for the Biological Sciences (22M:016)(1997-99).
I also coordinated our courses with the Department of Biology (together with H. Hethcote and J. Simon)(1998-2000).
8. Introduced a preparatory short seminar course designed for our entering graduate students that come with non- traditional backgrounds (with Profs. Philip Kutzko and Eugene Madison, 1998 to present).
9. Wrote the lecture notes for a six week summer course offered for the Iowa Biosciences Advantage Program (Summer 2000).
10. Published lecture notes for 22M:017 in the Math Lab website (Calculus for Business).
11. Published lecture notes for 22M:015 in the Math Lab website (Mathematics for the Biological Sciences).
12. Published permanent materials on trigonometry and periodic functions for biologists in Math Lab website.
13. Conduct a yearly seminar on teaching with first year teaching TA's.

Awards: Premio Universidad de Concepción, 1968, 2008 Huit Award.

Mentoring: Leonardo Morales (PhD 2001), Alberto Marrero (Ph D 2005), Juan Ariel Ortiz (Ph D 2007), Joaquín Rivera (Ph D 2007). Current mentor of Alvaro Correa.

Ph.D. Thesis Committees: Eric Smith, July 2001. Jaehoon Seol, May 2002. Leonardo Morales, May 2003. Victoria Shimanovich, May 2006, Juan Ariel Ortiz (May 2007), Joaquín Rivera, June 2007, Ricardo Ortiz, June 2007.

Ph.D. Thesis Directed:

William M. Smith. Thesis: An extension of cone techniques to wedges with applications to biological models, 1981.

* SACNAS is a professional society that promotes very heavily the sciences among Chicanos and Native Americans and is now influential in these matters in the US. It has been an integral part of my recruiting and mentoring efforts.