VICTOR H. DE LA PEÑA

2011

Office Ph. No. (212)-851-2144. Fax (212) 851-2164

Born (Victor Hugo de la Peña Dìaz Infante) in 1959, Leòn, Mèxico. US Citizen.

Marital Status

Married to Colleen M. Keegan, three children.
Victor K. de la Peña and Mary-Margaret K. de la Peña, Patrick K. de la Peña.

Education Ph.D., Statistics, University of California, Berkeley, June 1988
Ph.D. Adviser M.J. Klass.

M.A., Statistics, University of California, Berkeley, December 1984. Course work in Applied Statistics towards M.A. degree, September 1981-May 1982, University of California at Davis.

B.Sc., Mathematics (Higher Honors), The University of Texas at El Paso, August 1981.

Employment

2001 - *date*	Professor, Department of Statistics, Columbia University.
1993 - 2001	Associate Professor, Department of Statistics, Columbia University.
01-05, 1994	Visiting Associate Professor, Department of Mathematics, University of Southern California.
04-08, 1992	Professeur Associé, LSTA and Laboratoire de Probabilités, Universite Paris VI.
1988 - 1992	Assistant Professor, Department of Statistics, Columbia University.

Advising

PhD Students

1. Ming Yang (Oct. 1999 IEOR). Post-Doctoral student CAP (Columbia) 1999-2000.
Thesis title: On the order of the γ-th moment of the reflecting level crossing time and some general results.

2. Mona Zamfirescu (May 2003, Statistics). Baruch College, New York.
    Co-sponsor with I. Karatzas.
Thesis Title: Optimal Stopping under Model Uncertainty.

3. Carlo Marinelli (May 2004, Business School). Free University of Bolzano, Italy
Thesis title: On Stochastic Modeling and Optimal Control in Advertising.
Winner of a European Postdoctoral Institute Mathematics grant for 2005-2007.

4. Loran Chollette (May 2005, Business School).
    University of Stavanger, Norway.
Thesis title: Characterizing Dependence in Financial Series.

5. Gerardo Hernandez del Valle (May 2005, Statistics). Assistant Professor,
    Department of Statistics, Columbia University
Thesis title: First Passage Time Densities of Brownian Motion
    and Applications to Credit Risk.

6. Jesus Ruiz-Mata (May 2005 Statistics).
    Barclay's, New York.
Thesis title: Modelling Market and Credit Risk and Validation
    of Models.

7. Kobi Abayomi (Statistics)
    Assistant Professor, Georgia Tech.
Thesis title: Diagnostics for Multivariate Imputation and Copula Based
    Independent Component Analysis Applied to Environmental Index.

8. Lucy Robinson (Statistics).
Thesis title: Functional Clustering and Change Point Estimation in
    Multi-subject FMRI data
    Assistant Professor, Carnegie Mellon.
    Co-sponsored with Martin Lidquist

Honors

Elected Fellow of the Institute of Mathematical Statistics in 1999

Medallion Lecture for the Institute of Mathematical Statistics 2007

Professional Activities

Editorial Boards

Statistics and Probability Letters 2002-date.

Probability Surveys, 2004-date.

Test, 2010-date

Professional Societies

Member IMS, 1987 - 1991 and 1993 to Present.

Member AMS 1994 - 2001.

Member ASA 2002-2004.

Member of AAUP 1994, 1999, 2004-2005.

Member of AGU (American Geophysical Union) 2003-2005.

Corresponding Member, Casualty Actuarial Society 2005-2007.

National Committees

NSF Workshop on New Directions in Probability: Theoretical and Applied Spring 2002

NSF IGERT review meeting Summer 2003

Member of Accreditation Implementation Task Force, Society of Actuaries. Jan 2005-2006.

Member of Human Resources Advisory Board, Mathematical Sciences Research Institute (MSRI) 2006-2009.

Member of Committee of Visitors, NSF 2007

Departmental Service

Departmental Representative and Director of Undergraduate Studies from 1988-2002.
Co-Developed joint majors in Mathematics-Statistics, Economics-Statistics
and Political Science-Statistics.
Founding Director of Actuarial Program 1999.
Founding Director of Master of Sciences Program in Actuarial Sciences 2006.

Research Interests

Foundations: Inequalities in Probability and Statistics, Sequential Analysis, Boundary Crossing and Change Point Problems, U-statistics and Processes, Self-Normalized Processes, General Dependence Structures including Martingales, Decoupling, Copulas.

Applications: Managing Risk in Complex Systems. Finance, Banking, Actuarial Sciences, Earth Sciences (Global Warming).

Grants

National Science Foundation grant 9108006 for project entitled " Inequalities for Adapted Processes", July 1991-December 1992.

Grant from the Mathematical Sciences Research Institute, Berkeley, California to visit there for two weeks in September 1991 (full support).

Grant to visit D. Burkholder of the Department of Mathematics of The University of Illinois from January to March 1992 (full support).

Invited Professorship grant to visit J. Jacod, Director of the Laboratoire de Probabilites of Paris VI for one month in April 1992 (full support).

High Level Grant from the Centre National de la Recherche Scientifique of France to visit P. Deheuvels, Director of the Laboratoire de Statistique Théorique et Appliquée of Paris VI from June to August 1992 (full support).

National Science Foundation grant DMS # 93-1082 for project entitled " Tail Probability Approximations for Sums of Dependent Variables". Summer 1993 to Spring 1996.

Travel grant to visit the Department of Mathematics of the University of Strassbourg for one month, May 1994 (full support).

National Science Foundation grant DMS/Cluster C # 96-26175 for project entitled " L_p and Tail Probability Approximations for Sums of Dependent Variables". Summer 1996 to Spring 1999.

Books

1. *Decoupling: From Dependence to Independence* (Joint with E. Giné). Springer-Verlag, New York, 1999.

2. *Self-Normalized Processes: Limit Theorems and Statistical Applications.* (Joint with Q. M. Shao and T. L. Lai). Springer-Verlag, New York, 2009.

Publications

1. Bounds on the expectation of functions of martingales and sums of positive rv's in terms of norms of sums of independent random variables. *Proceedings of the American Mathematical Society*, Vol. **108**, No. 1, January 1990. pp. 233-239.

2. Decoupling and Khintchine's inequalities for U-statistics. *Annals of Probability,* Vol. **20** No. 4, 1992, pp. 1877-1892.

3. A note on a second moment of a randomly stopped sum of independent variables.

(With Z. Govindarajulu.) *Statistics and Probability Letters*, Vol. **14**, No. 4, July 1992, pp. 275-281.

4. Nuevas desigualdades para U-estadísticas y gráficas aleatorias. *Proceedings of IV Congreso Latinoamericano en Probabilidad y Estadística Matemática* in *Contribuciones en Probabilidad y Estadística*, No. 3 Edited by E. Cabaña, L. Gorostiza, P. Morettin, R. Rebolledo, V. Yohai and J. Ortega. Publisher, Instituto Nacional de Estadística, Geografía e Informática, Aguascalientes, Ags., México, May 1992 (in Spanish). pp. 290-296.

5. Sharp bounds on the L_p norm of a randomly stopped multilinear form with an application to Wald's equation. *"Probability in Banach Spaces, VIII"*. Edited by R. M. Dudley, M. G. Hahn, and J. Kuelbs. Birkhauser, New York, New York, August 1992. pp. 69-79.

6. Bootstrap goodness-of-fit tests based on the empirical characteristic function (Joint with D. Alemayehu and Evarist Giné). Proceedings of the conference on the Interface, Spring 1993.

7. Inequalities for tails of adapted processes with an application to Wald's lemma. *Journal of Theoretical Probability*, Vol. **6**, No. 2, April 1993, pp. 285-302.

8. Wald's lemma for a class of de-normalized U-statistics. (With Y.S. Chow and H. Teicher), *Annals of Probability*, Vol. **21**, No. 2, April 1993, pp. 1151-1158.

9. A Bound on the moment generating function of a sum of dependent variables with an application to simple random sampling without replacement. *Annales de L'Institute Henry Poincare: Probabilités et Statistiques* , Vol **30**, No. 2, 1994, pp. 197-211. Correction: *Annales de L'Institute Henry Poincare. Probabilités et Statistiques* , Vol **31**, No. 4, 1995, pp. 703-704.

10. Order of magnitude bounds for expectations involving quadratic forms (Joint with M. Klass). *Annals of Probability,* Vol. **22**, No. 2, April 1994, pp. 1044-1077.

11. Bounds on the tail probability of U-statistics and Quadratic Forms (Joint with S. J. Montgomery-Smith). *Bulletin of the American Mathematical Society*, Vol. **31**, No. 2, October 1994, pp. 223-227.

12. Contraction and decoupling inequalities for multilinear forms and U-statistics (Joint with S. Montgomery-Smith and J. Szulga). *Annals of Probability,* Vol. **22**, No. 4, October 1994, pp. 1745-1765.

13. Decoupling inequalities for the tail probabilities of multivariate U-statistics (Joint with S. J. Montgomery-Smith). *Annals of Probability,* Vol. **23**, No. 2, April 1995, pp. 806-816.

14. From dependence to complete independence: The decoupling approach. *Proceedings of "IV Simposio de Probabilidad y Procesos Estocasticos"*. Guanajuato, México, Spring 1996. Edited by L. G. Gorostiza, J. A. León, J. A. López-Mimbela. Aportaciones Matemáticas, Notas de Investigación No. 12. Sociedad Matemática Mexicana.

15. Wald's equation and asymptotic bias of randomly stopped U-statistics (Joint with T. L. Lai). *Proceedings of the American Mathematical Society.* **125**, No.3, March 1997,

pp. 917-925.

16. Exponential Burkholder-Davis-Gundy inequalities (Joint with N. Eisenbaum). *Bulletin of the London Mathematical Society,* Vol. **29**, 1997, pp. 239-242.

17. Decoupling inequalities: A view towards applications. *Proceedings of* 51st *Session of the International Statistical Institute* . Istanbul, Turkey, August 1997.

18. Moments of randomly stopped U-statistics (Joint with T. L. Lai). *Annals of Probability,* Vol. **25**, October 1997, pp. 2055-2081.

19. Decoupling inequalities: A second generation of martingale inequalities. For proceedings of conference *Probability towards the year 2000.* New York, Fall 1995.

20. On Wald's equation and first exit times for randomly stopped processes with independent increments. For *Proceedings of conference "Probability on Higher Dimensions"* in *Progress in Probability.* **43**, pp. 277-286. Oberwolfach, Germany, Summer 1996.

21. A general class of exponential inequalities for martingales and ratios. *University of Aarhus Research Report Series.* No. 378, June 1997. *Annals of Probability,* Vol. **27**, No. 1, January 1999, pp. 537-564.

22. Theory and applications of Decoupling (Joint with T. L. Lai). The Festscrift: "Probability and Statistical Models with Applications in Statistics" Volume in honour of of T. Cacoullous. pp. 117-145. Summer 1999. Athens, Greece. Eds. Charalambides, Koutras and Balakrishnan. Chapman Hall/CRC, Boca Raton, 2001.

23. Moment bounds for self-normalized processes. (Joint with T. L. Lai and M. J. Klass). *Progress in Probability, Proceedings of Conference on High Dimensional Probability II. Seattle 1999,* pp 3-12. Editors E. Giné, D. M. Mason and J. A. Wellner. Birkhäuser, Boston 2000.

24. Decoupling and domination inequalities with application to Wald's Identity for martingales (Joint with M. Zamfirescu). *Statistics and Probability Letters,* **57**, 157-170, 2002.

25. On extremal distributions and sharp L_p-bounds for sums of multilinear forms. (Joint with R. Ibragimov and S. Sharakhmetov). *Annals of Probability,* **31**, 2003, pp. 630-675.

26. On sharp Burkholder-Rosenthal-type inequalities for infinite degree U-statistics. (Joint with R. Ibragimov and S. Sharakhmetov). *Annales de L'Institute Henry Poincare. Probabilités et Statistiques* , Vol **38**, No. 6, 2002, pp 973-990.

27. Diffusions, exit time moments and Weierstrasss theorems. (Joint with P. McDonald). *Proc. Amer. Math. Soc.* Vol. **132**, No. 8, 2004, pp. 2465-2474.

28. Bounding the first passage time on an average. (Joint with M. Yang). *Statistics and Probability Letters,* Vol. 67, 2004, pp. 1-7.

29. Self-Normalized processes: exponential inequalities, moment bounds and iterated logarithm laws. (Joint with M. J. Klass and T. L. Lai). *Annals of Probability,* Vol. 32, No. 3A, 2004, pp. 1902-1933.

30. Option bounds. (Joint with R. Ibragimov and S. J. Jordan). *Journal of Applied*

Probability, Vol. 41A, 145-156, 2004.

31. Reseña de la Ley del Logaritmo Iterado para Martingalas Auto-Normalizadas. (Joint with M. J. Klass and T. L. Lai). *Proceedings of CLAPEM (Latinamerican Congress of Probability and Mathematical Statistics),* Punta del Este Uruguay 2004.

32. Characterizations of joint distributions, copulas, information, dependence and decoupling with applications to time series. (Joint with R. Ibragimov and Sh. Sharakhmetov), *IMS Lecture Notes-Monographs Series,* 2nd Lehmann Symposium - Optimality. Vol. 49 (2006), 183-209. J. Rojo Editor.

33. Quality control of risk measures: a tail of two powers. Joint with Jesus Ruiz-Mata and Ricardo Rivera. *Proceedings of Actuarial Research Conference, Society of Actuaries,* 2006. www.soa.com.

34. Quality control of risk measures (QCRM). Back-testing VAR models. (Joint with R. Rivera and J. Ruiz-Mata). *The Jorunal of Risk,* Vol. **9** No. 2, Winter 2006/07.

35. Indian Summer Monsoon and Rainfall and its Link with ENS0 and the Indian Ocean Diapole Mode. (Joint with Chie Ihara, Jochanan Kushnir and Mark Cane), 2005. *International Journal of Climatology* **27**: 179-187 (2007).

36. A pseudo-maximization approach for self-normalized processes. (Joint with M. J. Klass and T. L. Lai). *Probability Surveys.* Vol **4**, 172-192, 2007.

37. Multiple hypotheses testing of transition matrices. (Joint with A. Hernandez del Valle and R. Rivera). *The Journal of Risk Model Validation,* Vol. **1**, No. 3. Fall 2007.

38. Detecting Shifts in correlation and variability with application to ENSO-Monsoon rainfall relationships. Joint with Lucy F. Robinson and Yochanan Kushnir. *Journal of Theoretical and Applied Climatology.* Vol. **94**, 215-234, 2008.

39. Dynamic Backtesting of Value at Risk Models under regime change. (Joint with R. Rivera). *Journal of Risk Model Validation,* Vol. **1**, No. 4, 95-110, 2008.

40. Inverse problems for random walks on threes: Network Tomography. (Joint with H. Gzyl and P. McDonnald). *Statistics and Probability Letters.* Vol. **78**, no. 18, 3176-3183, 2008

41. Hitting time and inverse problems for Markov chains. (Joint with P. McDonnald and H. Gzyl). *Journal of Applied Probability.* Vol. **45**, no.3, 640-649, 2008.

42. *Self-Normalized Processes: Limit Theory and Statistical Applications.* (Joint with T. L. Lai and Q. Shao). Springer Verlag, New York, 2009.

43. Climate change over the equatorial Indo-Pacific in global warming. (Joint with C. Ihara, Y. Kushnir and M. Cane). *Jorunal of Climate* **Vol.** 22, No. 10, 2678-2693, 2009.

44. Theory and applications of multivariate self-normalized processes. (Joint with M. Klass and T. L. Lai). *Stochastic Processes and their Applications.* Vol. **119**, 4210-4227, 2009.

45. An Integral Equation for the Distribution of the First Exit Time of a Reflected Brownian Motion. *ANZIAM J.* Vol. 50, 445-454, 2009.

46. Exponential Inequalities for Self-Normalized Processes with applications. *Electronic Comm. Probab.*, 372-381. 2009. (joint with G. Pang.)

47. International Diversification: A copula approach. (Joint with L. Chollette and C. C. Liu). *Journal of Banking and Finance.* Vol. . 35, 403-417. 2011. Published in electronic form in 2010.

48. Quantifying Sustainability: Methodology for and Determinants of an Environmental Sustainability Index. Book Chapter in *Green Finance and Sustainability* (Joint with K. Abayomi, U. Lall and M. Levy. ed. Z.W. Luo. IGI Global 2010-2011.

49. On a new approach for estimating threshold crossing times with an application to global warming. *Proceedings of the 2011 New York Workshop on Computer, Earth and Space Science.* pp 8-12. Editors M. J. Wey and C. Naud. (joint with M. Brown, Y. Kushnir, T. Sit). http://giss.nasa.gov/meetings/cess2011, arXiv:1104.1580v2

Preprints

51. On estimating threshold crossing times. (joint with M. Brown, Y. Kushnir, T. Sit.)

50. Using transition default probabilities to calibrate risk ratings. (Joint with R. Rivera). (submitted).

52. Sharp probability inequalities and conservative testing procedures for studentized processes and moving averages with applications to econometric models and heavy tails. (Joint with R. Ibragimov).

53. Probabilistic criteria for the order of the moment of the first passage time. (Joint with M. Yang). Spring 2000.

54. From boundary crossing of non-random functions to first passage times of processes with independent increments. 1997.

55. Wald's equation and moment convergence in central limit theorem for randomly stopped martingales (Joint with T. L. Lai). 1998.

56. Decoupling inequalities for local times (Joint with N. Eisenbaum). 1994.