

# Serafín Martínez Jaramillo

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RESEARCH INTERESTS Systemic risk, financial contagion, network economics, financial networks, genetic algorithms, computational finance, agent-based economics, machine learning and pattern recognition.

EDUCATION *Doctor of Philosophy in Computational Finance, University of Essex, U. K.*  
*Master in Computer Science, University of Essex, U. K.*  
*Actuarial Sciences, Universidad Nacional Autónoma de México, México*

HONOURS AND AWARDS Mexican National Council of Sciences and Technology (CONACyT) Postgraduate Studies Scholarship, 2001-2006  
Scholarship for postgraduate studies, Banco de México, 2002-2003  
Member of the Mexican National Researchers System (SNI), 2009 - 2011  
Member of the Mexican National Researchers System Level I (SNI), 2012 - 2014  
Member of the Mexican National Researchers System Level I (SNI), 2015 - 2018  
Member of the Mexican National Researchers System Level II (SNI), 2019 - 2022  
Visiting Fellow, University of Essex, United Kingdom, 2011-2013  
Visiting Fellow, University of Essex, United Kingdom, 2014-2016

## SELECTED PUBLICATIONS

1. van der Leij, M., S. Martínez-Jaramillo & F. Lopez-Gallo (2019) “On Relations in the Unsecured and Secured Overnight Interbank Lending Markets,” work in progress.
2. Poledna, S., S. Martínez-Jaramillo, F. Caccioli & S. Thurner (2019) “Quantification of systemic risk from overlapping portfolios in the financial system,” *Journal of Financial Stability*, in press.
3. Martínez-Jaramillo S., C. Carmona & D. Kenett (2018) “Interconnectedness and Financial Stability,” *Journal of Risk Management for Financial Institutions*, in press.
4. de la Concha, A., S. Martínez-Jaramillo & C. Carmona (2018) “Multiplex Financial Networks: Revealing the Level of Interconnectedness in the Banking System,” *Complex Networks & Their Applications VI*, Springer International Publishing
5. Battiston, S. and S. Martínez-Jaramillo, (2018) “Financial networks and stress testing: Challenges and new research avenues for systemic risk analysis and financial stability implications”, *Journal of Financial Stability* Vol 35, pp 6-16
6. Anand, K., I. van Lelyveld, A. Banai, S. Friedrich, R. Garratt, G. Halaj, B. Howell, I. Hansen, S. Martínez-Jaramillo, H. Lee, J. L. Molina-Borboa, S. Nobili, S. Rajan, D. Salakhova, T. C. Silva, L. Silvestri, S. R. Stancato de Souza, (2018), “The missing links: A global study on uncovering financial network structure from partial data,” *Journal of Financial Stability*, Vol. 35, pp. 107-119.
7. Usi Lopez, M., S. Martínez-Jaramillo & F. Lopez-Gallo (2017), “The repo market in México: empirics and stylized facts,” *Neurocomputing, special issue on Machine Learning Applications in Finance*, Vol. 264, November 2017.
8. Levin, G., C. Lopez, F. Lopez Gallo & S. Martínez-Jaramillo (2017), “International banking and cross-border effects of regulation: the case of Mexico,” *International Journal of Central Banking*, Vol. 13 (S1), pp 249-271.
9. Batiz-Zuk, E., F. Lopez-Gallo, S. Martínez-Jaramillo & J. P. Solorzano-Margain (2016), “Calibrating limits for large interbank exposures from a system-wide perspective”, *Journal of Financial Stability*, Vol 27, pp 198–216.

10. Basel Committee on Banking Supervision (2015), “Making supervisory stress tests more macro-prudential: Considering liquidity and solvency interactions and systemic risk,” Basel Committee on Banking Supervision Working Paper No. 29, November 2015.
11. Poledna, S., Molina-Borboa, J. L., Martinez-Jaramillo, S., van der Leij, M., and Thurner, S. (2015). “The multi-layer network nature of systemic risk and its implications for the costs of financial crises.”, *Journal of Financial Stability*, Vol. 20, October 2015, pp 70–81
12. Martinez-Jaramillo, S., J. L. Molina-Borboa, B. Bravo Benitez (2015). “The Role of Financial Market Infrastructures in Financial Stability: An Overview,” *The Economics of Financial Market Infrastructures*, Diehl, M., Alexandrova-Kabadjova B., Heuver R. & Martinez-Jaramillo S., editors IGI Global.
13. Molina Borboa J. L., S. Martinez-Jaramillo, F. Lopez-Gallo, M. van der Leij (2015). “Link persistence and overlapping: a multiplex network analysis of the Mexican banking system,” *Journal of Network Theory in Finance*, 1(1), pp 99–138.
14. Bravo-Benitez B., B. Alexandrova-Kabadjova, S. Martinez-Jaramillo, (2014). “Centrality Measurement of the Mexican Large Value Payments System from the Perspective of Multiplex Networks,” *Computational Economics*, doi:10.1007/s10614-014-9477-0, pp 1–29.
15. Martinez-Jaramillo, S., B. Alexandrova-Kabadjova, G. Sierra and Elena B. Lozanova, (2014), “Financial education and financial inclusion: How lexicography makes sense,” *Proceedings of the Istanbul 9th International Academic Conference - The IISES 13th to 16th April 2014, Turkey*, ISBN 978-80-87927-00-7.
16. Martinez-Jaramillo S., B. Alexandrova-Kabadjova, B. Bravo-Benitez & J. P. Solorzano-Margain (2014), “An Empirical Study of the Mexican Banking System’s Network and its Implications for Systemic Risk,” *Journal of Economic Dynamics & Control*, March 2014, Volume 40, pp 242–265.
17. Basel Committee on Banking Supervision (2013), “Liquidity stress testing: a survey of theory, empirics and current industry and supervisory practices”, Basel Committee on Banking Supervision Working Paper No. 24, October 2013.
18. Basel Committee on Banking Supervision (2013), “Literature review of factors relating to liquidity stress – extended version”, Basel Committee on Banking Supervision Working Paper No. 25, October 2013.
19. Solorzano-Margain, J. P., S. Martinez-Jaramillo & F. Lopez-Gallo (2013), “Financial contagion: Extending the exposures network of the Mexican financial system”, *Computational Management Science*, June 2013, Volume 10, Issue 2-3, pp 125–155, Springer.
20. Garcia-Almanza A. L., B. Alexandrova-Kabadjova & S. Martinez-Jaramillo (2013), “Bankruptcy Prediction for Banks: An Artificial Intelligence Approach to Improve Understandability,” *Artificial Intelligence, Evolutionary Computing and Metaheuristics In the Footsteps of Alan Turing*, *Studies in Computational Intelligence series*, vol. 427, editor Xin-She Yang, Springer Berlin / Heidelberg, pp. 633-656, 2013.
21. Lopez-Castañon C., S. Martinez-Jaramillo & F. Lopez-Gallo (2012), “Systemic Risk, Stress Testing, and Financial Contagion: Their Interaction and Measurement,” *Simulation in Computational Finance and Economics: Tools and Emerging Applications*, editors B. Alexandrova-Kabadjova, S. Martinez-Jaramillo, A. L. Garcia-Almanza, E. Tsang, IGI Global, pp. 181-210, 2012.
22. Garcia-Almanza, A. L., S. Martinez-Jaramillo, B. Alexandrova-Kabadjova and Edward Tsang (2011), “Early signals for supervisory actions to prevent bank bankruptcy,” *Information Systems for Global Financial Markets: Emerging Developments and Effects*, editor A. Yap, IGI Global, pp. 369-382, 2011.
23. Peña, T., S. Martínez-Jaramillo & B. Abudu. (2011). “Bankruptcy Prediction: A Comparison of Some Statistical and Machine Learning Techniques,” Dawid, Herbert; Semmler, Willi (Eds.), *Computational Methods in Economic Dynamics*, Springer, 2011.
24. Martinez-Jaramillo S., O. Perez-Perez, F. Avila-Embriz & F. Lopez-Gallo. (2010). “Systemic Risk, Financial Contagion and Financial Fragility,” *Journal of Economic Dynamics and Control*, Vol. 34, No. 11, pp. 2358-2374.
25. Martinez-Jaramillo S., A. L. García-Almanza, B. Alexandrova-Kabadjova & T. Peña-Centeno. (2010) “Evolutionary Computation in Finance,” *Encyclopedia of Machine Learning*, Springer-Verlag Berlin Heidelberg.

26. Martínez-Jaramillo S., B. Alexandrova-Kabadjova & A. L. García-Almanza. (2010). "Evolutionary Computation in Economics," *Encyclopedia of Machine Learning*, Springer-Verlag Berlin Heidelberg.
27. García-Almanza A. L., B. Alexandrova-Kabadjova & S. Martínez-Jaramillo. (2010). "Evolutionary Computational Techniques in Marketing," *Encyclopedia of Machine Learning*, Springer-Verlag Berlin Heidelberg.
28. García-Almanza A. L., B. Alexandrova-Kabadjova & S. Martínez-Jaramillo. (2010). "Understanding Bank Failure: A Close Examination of Rules Created by Genetic Programming," *IEEE Electronics, Robotics and Automotive Mechanics Conference*, DOI 10.1109/CERMA.2010.14, pp. 34-39.
29. Martínez-Jaramillo, S. & E. Tsang. (2009). "An Heterogeneous, Endogenous and Coevolutionary GP-Based Financial Market," *IEEE Transactions on Evolutionary Computation*, IEEE Press, Vol. 13, Num. 1, pp. 33-55.
30. Martínez-Jaramillo, S. & E. Tsang. (2009). "Evolutionary Computation and Artificial Financial Markets," *Natural Computing in Computational Finance*, Vol. 185, A. Brabazon y M. O'Neill (eds.), Springer-Verlag Berlin Heidelberg, pp. 137-179.
31. Marquez, J. & S. Martínez-Jaramillo. (2009). "A Network Model of Systemic Risk: Stress Testing the Banking System," *Intelligent Systems in Accounting, Finance and Management*, Vol. 16, pp. 87-110.
32. Markose, S., E. Tsang & S. Martínez-Jaramillo. (2005). "The Red Queen Principle and the Emergence of Efficient Financial Markets: An Agent Based Approach," *Nonlinear Dynamics and Heterogeneous Interacting Agents*, *Lecture Notes: Economics and Mathematical Systems*, Springer-Verlag Berlin Heidelberg, Vol. 550, pp. 287-303.
33. Tsang E. & S. Martínez-Jaramillo. (2004). "Computational Finance," *IEEE Computational Intelligence Society*, IEEE Press, pp. 3-8.

SELECTED  
CONFERENCES,  
SEMINARS AND  
WORKSHOPS

"On Relations in the Unsecured and Secured Overnight Interbank Lending Markets" World Congress of the Econometrics Society, 17 - 21 August 2015, Palais des Congress; Montreal Canada.

"The multiplex network nature of financial systemic risk and its implications" Seminar on Network Analysis and Financial Stability Issues, December 10 - 11, 2014, CEMLA, Mexico City.

"Liquidity Hoarding in the Interbank Market", Conference on Collateral, Liquidity and Central Bank Operations, 10-11 September 2014. Bank of Canada, Ottawa, Canada.

"Calibrating limits for large interbank exposures from a system-wide perspective", "Conference on Data Standards, Information and Financial Stability" 11-12 April 2014. Loughborough University, UK.

"Calibrating limits for large interbank exposures from a system-wide perspective", "Financial Networks Workshop" 23 October 2013. Deutsche Bundesbank, Frankfurt, Germany.

"Financial contagion: extending the exposures network of the Mexican financial system", *Networks: A new Understanding for Practical International Economics*, 21 May 2013. World Bank, Washington DC, US.

"Calibrating limits for large interbank exposures from a system-wide perspective", 4th BIS Consultative Council for the Americas conference "Financial stability, macroprudential policy and exchange rates" 25-26 April 2013. Central Bank of Chile, Santiago, Chile.

"An Empirical Study of the Mexican Banking System's Network and its Implications for Systemic Risk", Workshop on supervising financial networks 13-14 February 2013. Deutsche Bundesbank, Frankfurt am Main (Eltville), Germany.

"Systemic risk measurement: Challenges and Opportunities", CCFEA's 10th Anniversary Workshop, 7 November 2012. University of Essex Colchester, UK.

"An Empirical Study of the Mexican Banking System's Network and its Implications for Systemic Risk", Latsis Symposium 12-14 September 2012. ETH Zurich, Switzerland.

“Systemic Risk Analysis by means of Network Theory: An Empirical Study of the Mexican Banking System”, Financial Stability Internal Seminar, Bank of Canada , Canada 2012.

“Network Models For Systemic Risk Monitoring”, IMF Conference Operationalizing Systemic Risk Monitoring, Washington DC 2010.

“Systemic Risk, Financial Contagion And Stress Testing: Their Interaction And Measurement”, BIS Conference Systemic risk, bank behaviour and regulation over the business cycle, Buenos Aires 2010.

“SYRNET: A Network Model Of Systemic Risk”, 3rd Annual Risk Management Conference Systemic Risk, Singapore 2009.

“A Network Model Of Systemic Risk”, Federal Reserve of Chicago Meeting, Chicago USA 2008.

“A Network Simulation Model For Systemic Risk Evaluation”, Workshop for non-supervisory Central Banks, México 2008.

“Bankruptcy Prediction: A Comparison Of Some Statistical And Machine Learning Techniques”, 14th International Conference on Computing in Economics and Finance, Paris France 2008.

“Systemic Risk: Stress Testing The Banking System”, IMF Meeting on Stress Testing , Amsterdam Netherlands 2007.

“Financial Contagion: A Network Model For Estimating The Distribution Of Losses”, 13th International Conference on Computing in Economics and Finance, Montreal Canada 2007.

“Co-Evolution Of Genetic Programming Based Agents”, 12th International Conference on Computing in Economics and Finance, Limasol Cyprus 2006.

“The Red Queen Principle And The Emergence Of Efficiency In Financial Markets” 8th Workshop on Economics and Heterogeneous Interacting Agents, Kiel Germany 2003.

#### EDITORIAL DUTIES

Co-editor of the books:

- Martin Diehl, Biliana Alexandrova-Kabadjova, Richard Heuver & Serafín Martínez-Jaramillo (2015) “Analyzing the Economics of Financial Market Infrastructures”, IGI Global, 2015.
- Alexandrova-Kabadjova, B.; Martinez-Jaramillo, S.; Garcia-Almanza, A.L.; Tsang, E. (2012) “Simulation in Computational Finance and Economics: Tools and Emerging Applications”, IGI Global, 2012.

Guest editor of the special issue:

- “*Network models, stress testing and other tools for financial stability monitoring and macroprudential policy design and implementation*” at the Journal of Financial Stability, 2018.
- “*Network models and stress testing for financial stability*” at the Journal of Financial Stability, 2019.

Referee for several conferences including:

- Network models, stress testing and other tools for financial stability monitoring and macroprudential policy design and implementation Mexico City, 11-12 November, 2015
- International Conference on Intelligent Computing ICIC 2006 Kunming China.
- IEEE CEC 2010, 2008, 2006, 2005 and 2003. The IEEE Congress on Evolutionary Computation
- UKCI 2010, the 10th Annual Workshop on Computational Intelligence
- EvoFIN 2010, 2011 The European event on Evolutionary and Natural Computation in Finance and Economics
- IEEE Symposium on Computational Intelligence for Financial Engineering & Economics 2011 and 2012
- World Congress on Computational Intelligence 2016, Vancouver Canada.

Referee for the journals:

- Applied Intelligence
- IEEE Transactions on Evolutionary Computation
- Journal of Economic Dynamics & Control
- Journal of Financial Stability
- Neural Computing and Applications
- International Journal of Modern Physics C
- Journal of Network Theory in Finance
- Journal of Banking and Finance

Editorial committee member of:

- Journal of Financial Stability
- Journal of Network Theory in Finance

Discussant for the conferences:

- Supervising Banks in Complex Financial Systems, Frankfurt 21-22 October 2013, Deutsche Bundesbank.
- Second Workshop on International Financial Markets, Ottawa 14th and 15th of June 2012, Banco de España and the Bank of Canada.
- Measuring Systemic Risk and Issues for Macroprudential Regulation, Bank of England 24 January - 25 January, 2011. Bank of England and London School of Economics.
- Second Annual Risk Management Conference: The Challenges of Risk Management in Volatile Financial Markets, Singapore 30 June - 2 July, 2008. Risk Management Institute and University of Singapore.

Co-organizer of the conferences:

- Network models and stress testing for financial stability Mexico City, 26-27 September, 2015, Organizers: Banco de México, University of Zurich, Bank of Canada and the Journal of Financial Stability.
- Network models, stress testing and other tools for financial stability monitoring and macroprudential policy design and implementation Mexico City, 11-12 November, 2015, Organizers: Banco de México, University of Zurich, CEMLA and the Journal of Financial Stability.
- Seminar on Network Analysis and Financial Stability Issues, December 10 - 11, 2014, CEMLA, Mexico City.

PROFESSIONAL  
EXPERIENCE

**Universidad Nacional Autónoma de México (UNAM)**, Ciudad Universitaria, México

*Teacher and Teaching Assistant*

**August 1995 – 1997**

Teacher and Teaching assistant for undergraduate courses in: introduction to programming, advanced programming, Networks analysis and advanced topics on operations research.

**Electrical Research Institute (IIE)**, Cuernavaca, México

*Research Assistant*

**1995 – 1996**

Research assistant for the project of measuring the energy savings due to the implementation in México of the daylight saving time program.

**University of Essex**, Colchester, Essex, UK

*Graduate Teaching Assistant*

**October 2002 – 2006**

Teaching assistant for undergraduate and graduate courses in: introduction to databases, advanced databases, constraint satisfaction, machine learning and neural networks.

**Banco de México, Mexico**

*Computer systems analyst*

**May 1997 – October 2001**

Computer systems analyst to select the tools for the institutional Datawarehouse and Datawarehouse developer for the Financial System Analysis General Directorate.

*Study leave*

**October 2001 – September 2006**

Study leave for master and PhD studies.

*Financial Researcher and Senior Financial Researcher*

**October 2006 – present**

Financial researcher and more recently senior financial researcher on systemic risk, financial contagion, bankruptcy prediction and financial networks.

**Centro de Estudios Latinoamericanos (CEMLA), Mexico**

*Advisor*

**January 2019 – present**

Senior researcher and advisor to CEMLA on financial stability and financial markets infrastructures related topics.

PROGRAMMING

C, C++, Matlab, basic Unix and Linux,  $\text{\LaTeX} 2_{\epsilon}$ , Visual Basic, SQL, Java, Data Stage, Whitelight, Oracle tuning for Datawarehousing.

REFEREES

**Professor Edward P. K. Tsang**

Professor

University of Essex

Colchester, Essex, U. K.

**Professor Sheri M. Markose**

Professor

University of Essex

Colchester, Essex, U. K.

**Dr Sergio Rajsbaum**

Researcher

Instituto de Matemáticas

UNAM, Ciudad Universitaria, México

**Professor Dietmar Maringer**

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University of Basel

Basel, Switzerland

Phones and email addresses are available upon request.