Luís M. Bettencourt

Pritzker Director
The Mansueto Institute for Urban Innovation, The University of Chicago

Professor
Ecology and Evolution, The University of Chicago

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Sociology, The University of Chicago

External Professor of Complex Systems
Santa Fe Institute

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Profile

I am currently the Pritzker Director of the Mansueto Institute for Urban Innovation, Professor of Ecology and Evolution, and Associate Faculty and Special Friend of Sociology at the University of Chicago. I am also an External Professor of Complex Systems at the Santa Fe Institute. I conduct interdisciplinary research on complex systems. I lead several research efforts the Santa Fe Institute in the areas of the science of cities, synthetic cognition and innovation in science and technology. I have published over 100 research papers in theoretical and statistical physics, epidemiology, computational neuroscience, information theory, science of science and technology and urban studies. My work is well known academically in the area of complex systems, especially of urbanism. It has been influential in articulating and new perspective on Cities and Urbanization and science in technology. My research is extensively covered in the media, including pieces in the New York Times, Boston Globe, Scientific American, the New Scientist, Wired, Fortune and other leading publications in over a dozen countries.

Work Experience

Pritzker Director of the Mansueto Institute
Professor of Ecology and Evolution
Associate Faculty and Special Friend of Sociology
The University of Chicago
July 2017-present

Professor of Complex Systems
Santa Fe Institute
November 2011-present

Scientist 4
Los Alamos National Laboratory
Los Alamos, NM, USA
Theoretical Division – T-5 (Applied Mathematics)
September 2005 – present

External Professor and Research Faculty (part-time)
Santa Fe Institute Santa Fe, NM, USA
June 2007 – present

Technical Staff Member [Research Scientist]
Los Alamos National Laboratory
Los Alamos, NM, USA
Computer and Computational Division
March 2003 – September 2005

Senior Postdoctoral Fellow
Center for Theoretical Physics
Massachusetts Institute of Technology Cambridge, MA, USA
December 2000 – March 2003

Slansky Distinguished Postdoctoral Fellow and Director's Postdoctoral Fellow
Los Alamos National Laboratory
Los Alamos, NM, USA
Theoretical Division
December 1997 -- March 2001

Postdoctoral Fellow at the Institute for Theoretical Physics
Heidelberg University

Heidelberg, Germany
Institute for Theoretical Physics
October 1996 -- November 1997

Education

Ph.D. in Theoretical Physics December 1996. Imperial College, University of London London, UK
October 1992 - September 1996,
Licenciatura [5 years] in Engineering Physics with First Class Honors.
Instituto Superior Técnico Lisbon, Portugal September 1987 - July 1992

Selected Research News Coverage

These Cities Could Lead the Driverless Car Revolution Fortune
The Relationships Between Skyscrapers and Great Cities Atlantic Urban Transit's Uncertain Future Nova
A Planet of Cities Christian Science Monitor
Y Combinator's Plan to Build a New City? Not Actually Crazy Wired
What Ancient Aztecs Shared with Modern New Yorkers Time
Scientific Proof that Cities are like Nothing Else in Nature Atlantic Cities Life in the City is Essentially one Giant Math Problem Smithsonian
Scientists Looking to Solve the Problem of Slums Devise a New Way to Look at Big Data TXchnologist
The laws of the city The Economist
Too Hard for Science : Simulating the human brain Scientific American
Collaboration: the mother of invention Boston Globe
Math and the City The New York Times Map of Knowledge The New York Times Knowledge, in Real Time SEED Magazine
Web usage data outline map of knowledge Nature News
A New Picture of the Two Cultures SEED Magazine
Map of Science Looks Like Milky Way Wired Science
Why the future of humanity and the long-term sustainability of the planet are inextricably linked to the fate of our cities. SEED Magazine
How the Crash Will Reshape America The Atlantic
Computer just might reveal the secrets of the brain Santa Fe New Mexican
Scientists examine new way to track outbreaks Santa Fe New Mexican
To escape flu - move to the country Telegraph.co.uk
The urban organism Nature News and Views
If You Can Make it There: Cities Are the Greatest Generators of Innovation and Wealth Scientific American
Big cities need a fast-paced life to grow Nature News
Innovation and Growth: Size Matters Breakthrough Ideas for 2007: Harvard Business Review
Ideas: the lifeblood of cities New Scientist

The Living City: A new science applies metabolism to the metropolis SEED Magazine Modeling the Emergence and Development of Scientific Fields U.S. Department of Energy: Office of Scientific and Technical Information

Projects and Grants

PI: Human Development and Community Dynamics in Cities Around the World Source of Support: The John D. and Catherine T. MacArthur Foundation Total Award Amount: $182,381
Total Award Period Covered: 1/1/2014 – 1/1/2016 Location of the Project: Santa Fe Institute

PI: Collection, Organization and Analyses of Community Based Survey Data from informal Settlements
Source of Support: Bill and Melinda Gates Foundation Total Award Amount: $1,025,572
Total Award Period Covered: 11/1/2012 – 12/31/2014 Location of the Project: Santa Fe Institute

PI: Energy and Environmental Drivers of Stress and Conflict in Multi-scale Models of Human Social Behavior
Source of Support: Army Research Office Total Award Amount: $400,000.
Total Award Period Covered: 3/15/2012 – 3/15/2010 Location of the Project: Santa Fe Institute

co-PI: Comprehensive Program to Develop Theory and Applications of Urban Organization and Dynamics
Source of Support: Rockefeller Foundation
Total Award Amount: $203,043
Total Award Period Covered: 4/1/2010 – 9/30/2010 Location of the Project: Santa Fe Institute

co-PI: Predictive Modeling of the Emergence Development of Scientific Fields Source of Support: MIT / NSF
Total Award Amount: $92,664
Total Award Period Covered: 7/1/2010 – 6/30/2012 Location of the Project: Santa Fe Institute
Investigator: REU Site SFI's Transdisciplinary Research through Computational Modeling in the Social, Biological, and Physical Sciences Program
Source of Support: NSF
Total Award Amount: $623,856
Total Award Period Covered: 06/01/10 – 05/31/2015 Location of the Project: Santa Fe Institute

co-PI: Innovation and Growth of Human Social Organizations from Cities to Corporations Source of Support: NSF
Total Award Amount: $106,425
Total Award Period Covered: 04/01/10 – 3/31/2011 Location of the Project: Santa Fe Institute

PI: Mapping the Structure and Evolution of Sustainability Science Research Source of Support: NSF
Total Award Amount: $82,802
Total Award Period Covered: 8/1/2008 – 1/31/2011 Location of Project: Santa Fe Institute

PI: Towards a Predictive Theory of Social Organization and Dynamics in Cities Source of Support: James S. McDonnell Foundation
Total Award Amount: $437,131
Total Award Period Covered: 9/1/2009 – 8/31/2012 Location of Project: Santa Fe Institute

PI: Synthetic Cognition through Petascale Models of the Primate Visual Cortex Source of Support: Department of Energy
Total Award Amount: $4,700.000.
Total Award Period Covered: October 2008 – October 2011 Location of Project: Los Alamos National Laboratory

co-PI: on Robust unsupervised operation under uncertainty through information theoretic optimization
Source of Support: Los Alamos National Laboratory LDRD Total Award Amount: $1,110,900
Total Award Period Covered: 10/01/2009 – 10/01/2012 Location of Project: Los Alamos National Laboratory

PI: Modeling the structure and dynamics of neural networks grown in vitro Source of Support: Los Alamos National Laboratory LDRD
Total Award Amount: $900,000
Total Award Period Covered: 10/01/2004 – 10/01/2007 Location of Project: Los Alamos National Laboratory

Honors and Awards

Invited to White House Frontiers Conference (2016)

Member of PCAST's (President's Council of Advisors on Science and Technology) Working Group) on "Technology and the Future of Cities" (2015). Member of the World Cities Summit Young Leaders (WCSYL) network (2015).

Kavli Fellow of the US National Academies of Science Presentation at Frontiers in Science Japan-USA, Tokyo December 2014.

Best Paper European Complex Systems Society annual meeting, October 2007.

Computer Research Association International Conference award "Grand Research Challenges in Information Security and Assurance", Airlie House, Warrenton, Virginia, November 16-19, 2003.

Slansky Distinguished Postdoctoral Fellowship, Theoretical Division. Los Alamos National Laboratory 2000, for interdisciplinary research.

Director's Postdoctoral Fellowship. Los Alamos National Laboratory 1998-2000. Portuguese National Science Foundation (JNICT)

Post-graduate Award, 1992--96, to conduct postgraduate studies leading a PhD degree.

Fellowship for Young Researchers, between 1990-92 by INIC, Portuguese National Institute for Scientific Research, while an undergraduate

Graduate supervision and teaching experience

Curriculum Committee: ASU / SFI Masters in Complex Systems (2016).

Faculty Director Global Sustainability Summer School: Urban Sustainability (2016). Lecturer Santa Fe Institute Complex Systems Summer School (2011, 2014).

Lecturer Lipari Summer School "Smart Cities" (2014).

Co-advised 6 PhD Theses in theoretical physics, computer science, science of science and technology, epidemiology and urban studies for students at MIT, Cornell U., Arizona State U., Indiana U. and UFMG (Brazil).

Invited graduate lecturer at several international summer schools in complex systems and applied mathematics.

MSc final research project on "Decision Theory, and the dynamics of trends" for students at Imperial College, University of London, academic year 2003/04 under the supervision of Professor R. J. Rivers.

Supervisor and mentor for summer students at SFI and LANL. These are Summer graduate programs for undergraduates and graduate students to experience research at LANL and SFI 1999-3003, 2007-2011.
Tutor at BUSSTEP., British Universities Summer School in Theoretical High Energy Physics, University of Sussex, Falmer, U.K. September 9-24, 1997. Tutors are selected among promising senior postdocs to cover the materials in the school's syllabus. These reflect the perceived basic and new exciting fields of high energy Physics and Cosmology. My field of expertise was non-equilibrium quantum fields.

Teaching Assistant in Dynamical Systems and Chaos, Imperial College, London, England. October 1994-January 1995.

Teaching Assistant in Quantum Mechanics, Imperial College, London, England. October 1993-January 1994.

Teaching Assistant in Thermodynamics, Instituto Superior Tecnico, Lisbon, Portugal. February 1992-July 1992.

Teaching Assistant in Classical Electrodynamics
Instituto Superior Tecnico, Lisbon, Portugal. October 1991-January 1992.

Assisted with final examinations for Physics undergraduates at the University of Heidelberg, between October 1996 and November 1997.

Other Scientific Activities

Member American Association Advancement of Science. Member American Association Geographers Member of Executive Committee of the Center for Non-linear Studies (Los Alamos National Laboratory)

Member of Search Committee Deputy Division Leader, Theoretical Division. Los Alamos National Laboratory.

Member of Editorial Board of Mathematics in Computer Science and Sustainability.

Consultant for Department of Energy, Office of Science and Technology Information (OSTI).

Reviewer for Department of Energy, National Science Foundation, National Institutes of Health, UK's EPSERC, Netherlands Organization for Scientific Research and Swiss National Science foundation.

Member of the American Physical Society (APS), Society for Pure and Applied Mathematics (SIAM), Society for Neuroscience (SfN), and Society for American Archeology (SAA).

Scientific Committee of "International Conference on mathematical aspects of Computer and information Sciences" (MACIS 2006), Beijing, China, July 2006 and of several other International conferences in Information Sciences, Computer Science and complex Systems.
Organizing Committee of "Opportunities and Challenges in Distributed Sensor Networks", LANL/CNLS March 2006.

Organizer of "Information Processing in Complex Systems" Seminar series, held at the Center for Non-Linear Science, LANL.

Referee for Science, Proceedings of the National Academy of Sciences (USA), Nature Physics, Complexity, Chaos, Physical Review Letters, Physical Review A, Physical Review D, Physical Review E, Physics Letters A, Annals of Physics, Physics of Plasmas, Journal of Statistical Physics,

Physica A, Quantum and Classical Gravity, Journal of Artificial Societies and Social Simulation, Urban studies and several others.

Scientific Secretary of School and A.S.I. in Current Topics in Astro-fundamental Physics, Erice, September 1994.

Assistant Coordinator of A.S.I. in Electroweak Physics and The Early Universe, Sintra, Portugal, March 1994.

Algorithmic and Computational Experience

Expertise in deep learning networks, bayesian inference methods, information theoretic optimization, numerical methods for ordinary and partial Differential Equations, stochastic systems, nonlinear dynamics, statistical inference from data, time series analyses, scaling analyses, and graph theory.

I know Unix/Linux, OS X operating systems and Python, PERL, c, HTML, D3 and several other data analysis, plotting and symbolic manipulation platforms: such as Mathematica, R, MATLAB.

Language Proficiency

I have native proficiency in Portuguese and English. I have fluent communication skills in Spanish, French and German and some oral proficiency in Italian.

Patents

Image fusion using sparse over-complete feature dictionaries, S. P. Brumby, L. M. A. Bettencourt, G. T. Kenyon, R. Chartrand, B. Wohlberg. USPTO patent number 9152881 (2015).

Publication List

104. Heterogeneity and Scale of Sustainable Development in Cities, C. Brelsford, J. Lobo, J. Hand, L. M. A. Bettencourt, in review in PNAS (2016).

103. Science and Practice for Thriving Cities. L. M. A. Bettencourt, J. Gonzales, Innovations (MIT Press), in print (2016).

102. Make it Bigger: Science for the Age of Digital Social Technologies. L. M. A. Bettencourt. Invited paper for the Social Sciences Research Council Digital Culture

Series.

101. Urban Skylines: building heights and shapes as measures of city size Markus Schläpfer, Joey Lee, and Luís M. A. Bettencourt, in review (2016)

100. Optimal Re-blocking as a Practical Tool for Neighborhood Development, C. Brelsford, L. M. Bettencourt, in review (2015).

99. Urban Scaling in Europe, L. M. Bettencourt and J. Lobo, in review (2015).

98. Population-area Relationship in Medieval European Cities, R Cesaretti, J Lobo, L. M. Bettencourt, S. Ortman, M. Smith, PLoS ONE 11(10): e0162678 (2016).

97. Spatial Selection and the Statistics of Neighborhoods, L. M. Bettencourt, J. Hand and J. Lobo, in review (2015).

96. The Topology of Cities, C. Brelsford, T. Martin, J. Hand and L. M. Bettencourt, in review (2015).

95. Formation of Scientific Fields as a Universal Topological Transition
L. M. A. Bettencourt and D. I. Kaiser, in review (2015).

94. Opportunities for Social Theory in the Age of Big Data
L. M. Bettencourt, SSRC City Papers (2015).

93. The Hypothesis of Urban Scaling: formalization, implications and challenges.
L.M. Bettencourt, J. Lobo, G. B West, H. Youn, arXiv:1301.5119. in review.

92. Invention as a Combinatorial Process: Evidence from US Patents:
H. Youn. L. M. Bettencourt, D. Strumsky, J. Lobo. in print in Journal Royal Society Interface (2015).

91. Settlement Scaling and Increasing Returns in an Ancient Society, S. Ortman, A. Cabaniss, J. Sturm, L.M. Bettencourt, in print in Scientific Advances (2015).

90. Industrial Ecology: The view from Complex Systems. L. M. Bettencourt, C. Brelsford, in print in J. Industrial Ecology (2015).

89. Cities as Complex Systems, L.M. Bettencourt, in Modeling Complex Systems for Public Policies, Ed. Bernardo A. Furtado (Spinger, Heidelberg, 2015).

88. Linked Activity Spaces: Embedding Social Networks in Urban Scape. Yaoli Wang, Chaogui Kang, L. M. Bettencourt, Yu Liu, Clio Andris. Computational Approaches for Urban Environments, Geotechnologies and the Environment: 13,

313-336 (2015).

87. The Kind of Problem a City Is. L. M. Bettencourt, in D. Offenhuber and C. Ratti. (eds) Die Stadt Entschlusseln: Wie Echtzeitdaten Den Urbanismus Verandern. (Birkhauser, Heidelberg, 2013).

86. The Lifespan of Publicly-Traded Companies: 1950-2009. M. Daepp, M. Hamilton, G. B. West, L.M.Bettencourt, to appear in J. R. Soc. Interface (2015).

85. Development, Information and Social Connectivity in Cote d'Ivoire. C. Andris, L.M. Bettencourt, Infrastructure Complexity 1: 1-18 (2015).

84. Impact of Changing Technology on the evolution of complex informational networks, L. M. Bettencourt, Proceedings of the IEEE: 102 1878-1891 (2014).

83. The Uses of Big Data in Cities. L.M. Bettencourt, Big Data 2: 12-22 (2014).

82. The Pre-History of Urban Scaling, S. Ortman, A. Cabaniss, J. Sturm, L.M. Bettencourt, PLoS ONE 9(2): e87902 (2014).

81. Professional Diversity and the Productivity of Cities. L. M. Bettencourt, H. Samaniego, H. Youn, Nature Scientific Reports 4, article number: 5393 (2014).

80. The Scaling of Human Interactions with City Size.
M. Schläpfer, L. M. A. Bettencourt, M. Raschke, R. Claxton, Z. Smoreda, G. B. West, C. Ratti, R. Soc J Interface 11: 20130789 (2014).

79. The Origin of Scaling in Cities. L. M. Bettencourt, Science 340 1438-1441 (2013).

78. Urban Scaling and the Production Function for Cities. J. Lobo, L. M. Bettencourt, D. Strumsky, G. B. West PLoS ONE 8(3): e58407 (2013)

77. The Statistics of Urban Scaling and its relation to Zipf's Law. A. Gomez-Lievano, H. Youn, L. M. Bettencourt, PLoS One. 2012; 7(7): e40393.

76. Contribution propagation: Explaining classifications in hierarchical models.
W. Landecker, M. Thomure, L.M. Bettencourt, G.T. Kenyon, M. Mitchell, S. P. Brumby, ICANN, 2012.

75. A symmetry-breaking generative model of a simple-cell/complex-cell hierarchy.
P. F. Schultz, LM Bettencourt, G. Kenyon, in Proceedings of the 2012 IEEE Southwest Symposium on Image Analysis and Interpretation - SSIAI 2012 (April 22-24, Santa Fe NM, 2012).

74. Big Cities do More with Less, L. M. A. Bettencourt, G. B. West, Scientific American (Spetember 2011).

73. Model Cortical Association Fields Account for the Time Course and Dependence on Target Complexity of Human Contour Perception. Vadas Gintautas, Michael I. Ham, Benjamin Kunsberg , Shawn Barr , Steven P. Brumby , Craig Rasmussen , John S. George , Ilya Nemenman, Luıs M. A. Bettencourt, Garrett T. Kenyon, PLoS Comp. Bio. 7(10): 10.1371 (2011).

72. Human Macroecology: Linking pattern and process in big-picture human ecology. W. R. Burnside, J. Brown, O. Burger, M. Hamilton, M. Moses, L. M. Bettencourt, Biological Reviews 87 194-208 (2012).

71. Determinants of the pace of innovation in energy technologies. L. M. Bettencourt, J. Trancik and J. Kaur, PLoS ONE 8(10): e67864 (2013).

70. Evolution and Structure of Sustainability Science. L. M. Bettencourt and J. Kaur, PNAS 108: 19540–19545 (2012).

69. Visually-salient contour detection using a V1 neural model with horizontal connections.
P. N. Loxley, L. M. Bettencourt, arXiv:1103.3531.

68. Ultra-fast detection of salient contours through horizontal connections in the primary visual cortex. P. N. Loxley, L. M. Bettencourt and G. T. Kenyon EJPB 93 64001 (2011).

67. A Unified theory of urban living. Luís M. A. Bettencourt and Geoffrey B. West Nature 467, 912–913 (2010).

66. Urban Scaling and Its Deviations: Revealing the Structure of Wealth, Innovation and Crime across Cities. Luís M. A. Bettencourt, José Lobo, Debrorah Strumsky and Geoffrey B. West, PLoS ONE 5(11): e13541 (2010).

65. Community Computing: Comparisons between Rural and Urban Societies Using Mobile Phone Data. N Eagle, Y. A. de Montjoye, L. M. A. Bettencourt
cse, vol. 4, pp.144-150, 2009 International Conference on Computational Science and Engineering, Vancouver, Canada, August 29-August 31 (2009).

64. Large-scale functional models of visual cortex for remote sensing. Steven P. Brumby, Garrett Kenyon, Will Landecker, Craig Rasmussen, Sriram Swaminarayan, and Luis M. A. Bettencourt, 38th IEEE Applied Imagery Pattern Recognition, Vision: Humans, Animals, and Machines, Cosmos Club, Washington DC October 14-16, 2009.

63. Clickstream Data Yields High-Resolution Maps of Science. Johan Bollen, Herbert Van de Sompel, Aric Hagberg, Luis Bettencourt, Ryan Chute, Marko
A. Rodriguez, and Lyudmila Balakireva, PLoS ONE 4, e4803 (2009).

62. The rules of information aggregation and emergence of collective intelligent behavior. L. M. Bettencourt, Topics in Cognitive Science 1, 598 - 620 (2009). 61. When is social computation better than the sum of its parts? Vadas Gintautas, Aric Hagberg, and Luís M.

A. Bettencourt, in Social Computing and Behavioral Modeling, Huan Liu, John J. Salerno, Michael J. Young (Eds), (New York, NY USA), pp. 93—101 (2009).

60. Scientific discovery and topological transitions in collaboration networks.
Luís M. A. Bettencourt, David I. Kaiser, and Jasleen Kaur, Journal of Informetrics 3, 210-221 (2009).

59. An ensemble trajectory method for real-time modeling and prediction of unfolding epidemics: analysis of the 2005 Marburg fever outbreak in Angola. Luís M. A. Bettencourt, to appear in Mathematical and Statistical Estimation Approaches in Epidemiology, Gerardo Chowell, Mac Hyman, Nick Hengartner, Luís M.A Bettencourt Carlos Castillo-Chavez (Eds) (Springer, Heidelberg, Germany, 2009), pp. 143-161.
.
58. Density-dependence of functional development in spiking cortical networks grown in vitro. Michael I. Ham, Vadas Gintautas, Marko A. Rodriguez, Ryan A. Bennett, Cara L. Santa Maria, Luis M.A. Bettencourt, Biological Cybernetics 102, 71-80 (2010).

57. The Self-Similarity of Human Social Organization and Dynamics in Cities.
Luís M.A. Bettencourt, José Lobo and Geoffrey B. West, in Complexity Perspectives on Innovation and Social Change, D. Lane, D. Pumain, S. Van der Leeuw and G. B. West (eds.), (Springer, Heidelberg, Germany, 2009).

56. The estimation of the effective reproductive number from disease outbreak data. A. Cintron-Arias, C. Castillo-Chavez, L.M.A. Bettencourt, A. L. Lloyd, and H. T. Banks, Mathematical Biosciences and Engineering 6, 261-282 (2009).

55. Why are large cities faster? Universal scaling and self-similarity in urban organization and dynamics. Luis M. A. Bettencourt, J. Lobo, and G. B. West, European Physical Journal B, 63 285-293 (2008).

54. Spontaneous coordinated activity in cultured networks: Analysis of multiple ignition sites, primary circuits, and burst phase delay distributions. Michael I. Ham, Luis M. Bettencourt, Floyd D. McDaniel and Guenter W. Gross, Journal of Computational Neuroscience 24: 346-357 (2008).

53. Identification of functional information subgraphs in complex networks. L. M. Bettencourt, V. Gintautas, and M. Ham, Phys. Rev. Lett. 100: 238701 (2008).

52. Real Time Bayesian Estimation of the Epidemic Potential of Emerging Infectious Diseases. L. M. A. Bettencourt, and R. M, Ribeiro, PLoS ONE 3(5) (2008).

51. Quantifying Social and Opportunistic Behavior in Email Networks.
L. H. Gomes, V. A. F. Almeida, J. M. Almeida, F. D. O. Castro, and L. M. A. Bettencourt. Advances in Complex Systems 12, 99-112 (2009).

50. Population Modeling of the Emergence and Development of Scientific Fields.
Luis M. A. Bettencourt, D. I. Kaiser, J. Kaur, C. Castillo-Chavez, and D. Wojick, Scientometrics 75: 495-518 (2008).

49. Comparative estimation of the reproduction number for pandemic influenza from daily case notification data. G. Chowell, H. Nishiura, Luis M.A. Bettencourt J R Soc Interface 4, 155-166 (2007)

48. Separating the Wheat from the Chaff: Practical Anomaly Detection Schemes in Ecological Applications of Distributed Sensor Networks. Luís M. A. Bettencourt, Aric A. Hagberg and Levi B. Larkey, in Proceedings of Distributed Computing in Sensor Systems (DCOSS 07), (Santa Fe, NM USA), pp. 223--239, Jun 2007.

47. Towards real-time epidemiology: data assimilation, modeling and anomaly detection of health surveillance data streams. Luis M.A. Bettencourt, R.M. Ribeiro, G. Chowell, T. Lant, C. Castillo-Chavez Zeng et al.(Eds.) Intelligence and security informatics: Biosurveillance Proceedings of the 2nd NSF Workshop, Biosurveillance, 2007.Lecture Notes in Computer Science. Springer-Verlag Berlin Heidelberg (2007).

46. Growth, Innovation, Scaling, and the Pace of Life in Cities"
Luis M. A. Bettencourt, J. Lobo, D. Helbing, C. Kuhnert, G. B. West, Proc Natl Acad Sci USA PMID 17438298 (2007).

45. Invention in the City: Increasing Returns to Scale in Metropolitan Patenting. Luis M. A. Bettencourt, J. Lobo, and D. Strumsky, Research Policy 36: 107-120 (2007).

44. The 1918–1919 influenza pandemic in England and Wales: spatial patterns in transmissibility and mortality impact. Gerardo Chowell, Luis M. A. Bettencourt, Niall Johnson, Wladimir J. Alonso, Cécile Viboud, Proceedings of the Royal Society B: Biological Sciences doi:10.1098/rspb.2007.1477 (2007).

43. Spontaneous coordinated activity in cultured networks: Analysis of multiple ignition sites, primary circuits, and burst phase delay distributions. Michael I. Ham, Luis M. Bettencourt, Floyd D. McDaniel, Guenter W. Gross, J Comput Neurosci. DOI 10.1007/ s10827-007-0059-1 (2007).

42. The functional structure of cortical neuronal networks grown in vitro. L. M. A. Bettencourt, G. J. Stephens, M. I. Ham, and G. W. Gross, Physical Review E 75, 021915 (2007).

41. New Opportunities in Ecological Sensing using Wireless Sensor Networks. S. L. Collins, L. M. A. Bettencourt, A. Hagberg, L. Larkey, R. F. Brown, D.I. Moore, G. Bonito, K. A. Delin, S. P. Jackson, D. W. Johnson, S. C. Burleigh, R. R. Woodrow, and J. M. McAuley, Frontiers in Ecology and the Environment 4, 402-407 (2006).

40. Tipping the balances of a small world. L. M. A. Bettencourt, arXiv/cond-mat 0304321

39. From boom to bust and back again: the complex dynamics of trends and fashions. L. M. A. Bettencourt. arXiv/cond-mat: 0212267

38. The power of a good idea: Quantitative Modeling of the Spread of Ideas from Epidemiological Models. L. M. A. Bettencourt, A. Cintron-Arias, D. I. Kaiser, C. Castillo-Chavez, Physica A 364 513–536 (2006).

37. Improving Spam Detection Based on Structural Similarity. L. H. Gomes, F. D. O. Castro, R. B. Almeida, Luis M. A. Bettencourt, Virgilio A. F. Almeida, Jussara M. Almeida. In SRUTI: Steps to Reducing Unwanted Traffic on the Internet, July 7-8, 2005, MIT, Cambridge, MA, USA.

36. Comparative graph theoretical characterization of networks of spam and regular email. L. H. Gomes, R. B. Almeida, L. M. A. Bettencourt, V. A. F. Almeida, J. M. Almeida, In CEAS 2005, July 21 & 22, at Stanford University, Stanford, CA, USA.

35. The self-consistent bounce: an improved nucleation rate. Y. Bergner, and L. M. A. Bettencourt, Physical Review D 69, 045012 (2004).

34. Dressing Up the Kink. Y. Bergner, and L. M. A. Bettencourt, Physical Review D 69, 045002 (2004).

33. A step beyond the bounce: bubble dynamics in quantum phase transitions. Y. Bergner, and L. M. A. Bettencourt, Physical Review D 68 025014 (2003).

32. Vortex description of the first order phase transition in the two-dimensional Abelian-Higgs model. L. M. A. Bettencourt , and G. J. Stephens, Phys. Rev. E 67, 066105 (2003).

31. The role of point-like topological excitations at criticality: from vortices to global monopoles. N. D. Antunes, L. M. A. Bettencourt , and M. Kunz, Physical Review E 65, 066117 (2002).

30. Relativistic hydrodynamic scaling from the dynamics of relativistic quantum field theory. L. M. A. Bettencourt , F. Cooper and K. Pao, Physical Review Letters 89, 112301 (2002).

29. Critical Dynamics of gauge systems: Spontaneous vortex formation in 2D superconductors. G. Stephens, L. M. A. Bettencourt and W. H. Zurek, Physical Review Letters 88 137004 (2002).

28. Dynamical behavior of spatially inhomogeneous relativistic $\phi 4$ quantum field theory in the Hartree approximation. L. M. A. Bettencourt , K. Pao and J. Sanderson, Physical Review D 65 025015 (2002).

27. Langevin evolution of disoriented chiral condensates, L. M. A. Bettencourt , K. Rajagopal and J. Steele, Nuclear Physics A 693 825 (2001).

26. The role of topological excitations at second order transitions. L. M. A. Bettencourt , Invited contribution to Fluctuating Paths and Fields, Festschrift Dedicated to Hagen Kleinert on the Occasion of His 60th Birthday (World Scientific, Singapore, 2001).

25. Properties of the Langevin and Fokker-Planck equations for scalar fields and their application to the dynamics of second order transitions. L. M. A. Bettencourt , Physical Review D 63 045020 (2001).

24. Predicting the critical density of topological defects in O(N)scalar field theories.
N. D. Antunes, L. M. A. Bettencourt, and A. Yates, Physical Review D 64 065020 (2001).

23. Ginzburg regime and its effects on topological defect formation. N. D. Antunes, L. M. A. Bettencourt and W. H. Zurek. Physical Review D 62 065005 (2000).

22. The electrical conductivity in high temperature QED. L. M. A. Bettencourt , E. Mottola, Proceedings of ``Strong and Electroweak Matter 2000'', Ed. C. Korthals-Altes.

21. Topological excitations and second order transitions in 3D O(N) models.
L. M. A. Bettencourt , Invited lecture. In the proceedings of
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