Maria-Rita D'Orsogna
California State University at Northridge, CA 91130
dorsogna@csun.edu (818) 677 2703

Posizione attuale:

Professore Associato, Dipartimento di Mathematica CSUN 2007 - presente

Professore Associato, Dipartimento di Biomathematica UCLA 2014 - presente

Interessi di ricerca:

Meccanica statistica, modellistica matematica, analisi numerica e analitica di sistemi biologici e complessi

Titoli di studio:

Ph.D. Fisica, University of California at Los Angeles, 2003
Tesi: Charge transfer in DNA: the role of thermal fluctuations and of symmetry

M.A. Fisica, University of Maryland at College Park, 1998
Tesi: Unified treatment of step-edge fluctuations: limiting cases and crossover behavior
Growth on Cu100 using improved simulation algorithm

Laurea in Fisica, Università di Padova, 1996
Tesi: Directed paths in random media, discontinuous depinning from rough substrates
110 e lode

Esperienza professionale:

Assistente di ricerca, Dipartimento di Matematica, UCLA, 2004-2007
Studi di aggregazione di molti-corpi interagenti in biologia e in robotica.
Implementazione nel laboratorio di robotica di modelli matematici.
Accoppiamento ligandi e recettori in biologia

Assistente di ricerca, Dipartimento di Chimica, Caltech, Pasadena, CA 2003-2004
Modelli su reticolo e simulazioni Montecarlo di membrane biologiche e di acqua di superficie

Analista, IBM Milano, 1998-1999

Servizi professionali, premi e associazioni:

Jerome Ritchfield fellow, Miglior ricercatore universitario California State University at Northridge, Aprile 2014

National Academies Keck Futures Initiative on Collective Behavior,
Selezionata come membro di commissione di dodici sul futuro della ricerca e applicazioni su particelle interagenti, Novembre 2014

International Frontiers of Science Symposium,
Selezionata come parte di gruppo di giovani ricercatori a rappresentare gli USA in un convegno internazionale sul futuro delle scienze interdisciplinari, Aprile 2013

Peer-reviewer per the National Science Foundation, the National Academy of Sciences, the Netherlands Organisation for Scientific Research, the Physical Review, SIAM, IEEE Conference Proceedings, Springer Verlag publishing, Physica A and D, the European Physical Journal, the Journal of Statistical Physics, the Journal of Non-Linear Science, Physics Letters A, the International Journal of Control, Differential Equations and Dynamical Systems, Biophysical Journal

Membro dell' American Physical Society, the Society for Industrial and Applied Mathematics, the Biophysical Society

Contributo a Gradstein and Ryzhik, 'Table of Integrals, Series and Products', 7^{th} ed. Nuova serie di integrali Listed at http://mathworld.wolfram.com/Erf.html

Pubblicazioni:

38. *Stochastic coagulation and fragmentation: incommensurability and first passage times*
Q. Lei, M. R. D'Orsogna and T. Chou, submitted (2014)

37. *Statistical physics of crime: A review*
M. R. D'Orsogna and M. Perc, submitted (2014)

36. *Hydrocarbon contamination in sediments of the Pertusillo freshwater reservoir, Val d'Agri Southern Italy* A. Colella and M. R. D'Orsogna, submitted (2014)

35. *Crime, punishment and evolution in an adversarial game*
M. McBride, R. Kendall, M. B. Short and M. R. D'Orsogna, submitted (2014)

34. *First passage problems in biology*
T. Chou and M. R. D'Orsogna, in "First-passage phenomena and their application", 306-345 edited by R. Metzler, G. Oshanin, S. Redner, World Scientific, Singapore (2014)

33. *Recidivism and rehabilitation of criminal offenders: A carrot and stick evolutionary game*
B. Berenji, T. Chou and M. R. D'Orsogna, PLoS One **9** e85531 (2014)

32. *Combinatoric and mean-field analysis of heterogeneous self-assembly*
B. Zhao, B. Berenji, T. Chou and M. R. D'Orsogna, *J. Chem. Phys.* **1**39 121918 (2013)

31. *Criminal defectors lead to the emergence of cooperation in an experimental, adversarial game*
M. R. D'Orsogna, M. McBride, R. Kendall and M. Short, PLoS One **8** e61458 (2013)

30. *External conversions of player strategy in an evolutionary game: A cost benefit analysis through optimal control*
M. Short, A. Pitcher and M. R. D'Orsogna, Euro. J. Appl. Math. **24** 131 (2013)

29. *Territorial developments based on graffiti: a statistical mechanics approach*
A. Barbaro, L. Chayes and M. R. D'Orsogna, Physica A **392** 252 (2013)

28. *First passage times in homogeneous nucleation and self-assembly*
R. Yvinec, M. R. D'Orsogna and T. Chou, J. Chem. Phys. **137** 244107 (2012)

27. *Desert locust dynamics: behavior phase change and swarming*
C. Topaz, M. R. D'Orsogna, L. E. Keshet and A. Bernoff, PLoS Comp. Biol. **8** e1002642 (2012)

26. *Stochastic self-assembly of incommensurate clusters*
M. R. D'Orsogna, G. Lakatos and T. Chou, J. Phys. Chem. **136** 084110 (2012)

25. *Coarsening and accelerated equilibration in mass-conserving heterogeneous nucleation*
T. Chou and M. R. D'Orsogna, Phys. Rev. E **84** 011608 (2011)

24. *Cooperation and punishment in an adversarial game: How defectors pave the way to peaceful society*
M. B. Short, J. Brantingham, M. R. D'Orsogna, Phys. Rev. E **82** 066603 (2010)

23. *Diffusion-dependent mechanisms of receptor engagement and viral entry*
M. Gibbons, T. Chou, M. R. D'Orsogna, J. Phys. Chem. B **114** 15403-15412 (2010)

22. *Arrival times in a zero-range process with injection and decay*
B. Shargel, M. R. D'Orsogna and T. Chou, J. Phys. A. **43** 305003 (2010)

21. *Optimal transport and apparent drug resistance in viral infections*
M. R. D'Orsogna, T. Chou, PLoS One **4** e8165 (2009)

20. *Enhancement of cargo processivity by cooperating molecular motors*
F. Posta, M. R. D'Orsogna, T. Chou, Phys. Chem. Chem. Phys **11**, 4851 (2009)

19. *Double milling in self-propelled swarms from kinetic theory*
J. Carrillo, M. R. D'Orsogna, V. Panferov, Kin. Rel. Mod. **2** 363 (2009)

18. *Measuring and modeling repeat and near-repeat burglary effects*
M. Short, M. R. D'Orsogna, G. Tita, J. Brantingham, J. Quant. Criminol. 10.1007 (2009)

17. *A statistical model of criminal behavior*
M. Short, M. R. D'Orsogna, V. Pasour, G. Tita, P. Brantigham, A. Bertozzi, L. Chayes, Math. Mod. Meth. Appl. Sci. **18** 1249 (2008)

16. *Multi-stage adsorption of diffusing macromolecules and viruses*
T. Chou, M. R. D'Orsogna, J. Chem. Phys. **127** 105101 (2007)

15. *State transitions and the continuum limit for interacting, self-propelled particles*
Y. Chuang, M. R. D'Orsogna, D. Marthaler, A. Bertozzi, L. Chayes, Phys. D **232** 33 (2007)

14. *Exact steady states for translocation ratchets driven by random sequential adsorption*
M. R. D'Orsogna, T. Chou, T. Antal, J. Phys. A **40** 5575 (2007)

13. *Multi-Vehicle flocking: Scalability of Cooperative Control Algorithms using Pairwise Potentials*
Y. Chuang, Y. Huang, M. R. D'Orsogna, A. Bertozzi, Proceedings from the IEEE International Conference on Robotics and Automation, 2292 (2007)

12. *Self-propelled particles with soft-core interactions: patterns, stability and collapse.*
M. R. D'Orsogna, Y. Chuang, A. Bertozzi, L. Chayes, Phys. Rev. Lett. **96** 104302 (2006)

11. *Pattern formation, stability and collapse in 2D driven particle systems.*
M. R. D'Orsogna, Y. Chuang, A. Bertozzi, L. Chayes in 'Device applications of non linear dynamics', page 103, edited by A. Bulsara and S. Baglio (Springer-Verlag , Berlin Heidelberg, 2006)

10. *First Passage and Cooperativity of Queuing Kinetics*
M. R. D'Orsogna, T. Chou, Phys. Rev. Lett. **95** 170603 (2005)

9. *Interparticle gap distributions on one-dimensional lattices*
M. R. D'Orsogna, T. Chou, J. Phys. A **38** 531 (2005)

8. *Chiral molecule adsorption on helical polymers*
M. R. D'Orsogna, T. Chou, Phys. Rev. E **69** 021805 (2004)

7. *Interplay of chemotaxis and chemokinesis mechanisms in bacterial dynamics*
M. R. D'Orsogna, M. A. Suchard, T. Chou, Phys. Rev. E **68** 021925 (2003)

6. *Charge transfer, symmetry, and dissipation in donor-acceptor molecules*
M. R. D'Orsogna, R. Bruinsma, Phys. Rev. Lett. **90** 078301 (2003)

5. *Two-level system with a thermally fluctuating transfer matrix element: Application to the problem of DNA charge transfer*
M. R. D'Orsogna, J. Rudnick, Phys. Rev. E **66** 041804 (2002)

4. *Fluctuation-facilitated charge migration along DNA*
R. Bruinsma, G. Grüner, M. R. D'Orsogna, J. Rudnick, Phys. Rev. Lett. **85** 4393 (2000)

3. *Edge diffusion during growth: The kink Ehrlich-Schwoebel effect and resulting instabilities*
O. Pierre-Louis, M. R. D'Orsogna, T. Einstein, Phys. Rev. Lett. **82** 3661 (1999)

2. *Wetting of rough walls*
A. Stella, G. Sartoni, G. Giugliarelli, M. R. D'Orsogna, Int. J. Thermophys. **19** 1209 (1998)

1. *Effect of surface roughness on bulk-disorder-induced wetting*
G. Sartoni, A. Stella, G. Giugliarelli, M. R. D'Orsogna, Europhys. Lett. **39** 633 (1997)

Seminari e colloqui:

Case Western University, Cleveland, Mathematics Department, Aprile 2014
Université Pierre et Marie Curie, Paris, France, Mathematics Department, Marzo 2014
University of North Carolina at Chapel Hill, Raleigh, Mathematics Department, Febbraio 2014
University of Colorado, Boulder, Mathematics Department, Ottobre 2013
University of Cagliari, Biochemistry Department, Giugno 2013
University of Vienna, Austria, Mathematics Department, Giugno 2012
University of Graz, Austria, Mathematics Department, Giugno 2012
California Nanoscience Initiative, University of California at Santa Barbara, Febbraio 2012
University of California at Los Angeles, Biomathematics Department, Febbraio 2012
University of California at Riverside, Mechanical Engineering Department, Novembre 2011
University of California at Santa Barbara, Mathematics Department, Febbraio 2011
Università degli studi di Pescara, Dipartimento di Economia, Dicembre 2010
Università degli studi di Padova, Dipartimento di Fisica, Giugno 2009
Centre de Recerca Matematica, Barcelona, Spain, Mathematics Department, Giugno 2009

University of California at Los Angeles, Mechanical Engineering Department, Maggio 2008
University of California at Riverside, Physics Department, Febbraio 2008
University of California at Los Angeles, Biomathematics Department, Novembre 2007
University of British Columbia, Mathematics Department, Ottobre 2007
University of Alberta, Mathematics Department, Ottobre 2007
California State University at Northridge, Mathematics Department, Maggio 2007
Purdue University, Physics Department, Marzo 2007
Virginia Tech, Engineering and Applied Math Department, Marzo 2007
University of South Florida, Physics Department, Marzo 2007
University of California at Merced, Math Department, Febbraio 2007
University of Virginia, Physics Department, Febbraio 2007 - colloquium
University of Michigan at Ann Arbor, Physics Department, Gennaio 2007 - colloquium
Claremont Graduate University, Mathematics Department, Dicembre 2006 - colloquium
Carnegie Mellon University, Physics Department, Novembre 2006 - colloquium
George Mason University, Physics Department, Maggio 2006
Università di Roma La Sapienza, Dipartimento di Fisica, Marzo 2006
University of California at Los Angeles, Math Department, Maggio 2005
University of California at Los Angeles, Chemistry Department, Aprile 2005
University of Amsterdam, Physics Department, Marzo 2005
Caltech, Chemistry Department, Febbraio 2003
University of California at San Diego, Physics Department, Febbraio 2003
Università degli studi di Padova, Dipartmento di Fisica, Giugno 2002
University of Maryland, Physics Department, Settembre 1998

Conferences and Programs:

Institute for mathematics and its applications
St. Paul, Minnesota Aprile 2015

National Academies Keck Futures Initiatives on Collective Behavior
Irvine, CA Novembre 2014

Kavli Institute for Theoretical Science
Santa Barbara, CA Luglio-August 2014

10^{th} AIMS conference on Dynamical systems, differential equations and applications,
Madrid, Spain Luglio 2014 - invited talk

Festival della Complessità
Università di Chieti, Luglio 2014 - invited talk

AMS Sectional Meeting
Albuquerque, NM Aprile 2014 - invited talk

IPAM Materials for a sustainable future,

Los Angeles, CA, Settembre-Dicembre 2013

SIAM annual meeting
San Diego, CA Luglio 2013 - invited talk

Indo-American Frontiers of Science Symposium
Agra, India Aprile 2013 - invited talk

IMPA Mathematical models and modeling of biophysical phenomena
Rio de Janeiro, Brazil Marzo 2013 - invited talk

CEAMOS Third Workshop on Analysis and Modelling of Security
WAMOS 2013, Santiago, Chile Gennaio 2013 - invited talk

PIMS Workshop on Computational Criminology
Vancouver, BC Settembre 2012 - invited talk

MoCCsy 5^{th} Annual Symposium,
Vancouver, BC Settembre 2012 - invited talk

9^{th} AIMS conference on Dynamical Systems, Differential Equations and Applications,
Orlando, FL Luglio 2012 - 2 invited talks

SIAM Conference on Nonlinear Waves and Coherent Structures,
Seattle, WA Giugno 2012 - invited talk

Spring Symposium on Game Theory for Security, Sustainability and Health, Stanford,
Palo Alto, CA Marzo 2012

10^{th} International Conference on Operations Research, L'Havana, Cuba, Marzo
2012 - invited talk

Emergent behaviour in multi-particle systems with non-local interactions, Banff International Research Station, Banff, Canada, Gennaio 2012 - invited talk

Mathematical Theory and Simulation of Phase Transitions, Beijing, China,
Novembre 2011

The USC Physical Sciences in Oncology Center First Annual Short Course, Los Angeles,
CA Ottobre 2011

Mathematical Biosciences Institute Workshop on New Questions in Probability Theory Arising in Biological Systems, Columbus, OH Settembre 2011

International Congress on Industrial and Applied Mathematics, Vancouver, Canada, Luglio 2011 - invited talk

Foundations of Computational Mathematics, Budapest, Hungary, Luglio 2011 - invited talk

IMPA Mathematical Methods and Modeling of Biophysical Phenomena, Foz do Iguacu, Parana, Brazil, Marzo 2011 - invited talk

Mathematical Biosciences Institute Workshop on Insect Self-organization and Swarming, Columbus, OH Marzo 2011

Southern California Systems Biology Conference,
University of California at Irvine, CA Gennaio 2011

Arthur M. Sackler Colloquia of the National Academy of Sciences - In the Light of Evolution V: Cooperation, Irvine, CA Gennaio 2011

AMS Sectional Meeting - Los Angeles, CA Ottobre 2010 - invited talk

8th International Conference of Numerical Analysis and Applied Mathematics, Rhodes, Greece, Settembre 2010 - invited talk

CAIMS - Dynamical systems, St.John's, Canada, Luglio 2010 - invited talk

SIAM Emerging topics in dynamical systems and partial differential equations Barcelona, Spain, Maggio 2010 - invited talk

AMS Pattern formation in biological systems, St. Paul, MN Aprile 2010 - invited talk

Winter school and 9^{th} ICOR on PDEs and Mathematical Biology, L'Havana, Cuba, Febbraio 2010 - invited talk

SIAM Analysis of partial differential equations Miami, FL Dicembre 2009 - invited talk

Kinetic and mean-field models in the socio-economic sciences, Edinburgh, Scotland, Luglio 2009 - invited talk

Deterministic and stochastic modeling in computational neuroscience and other biological topics, Barcelona, Spain, Maggio 2009 - invited talk

Statistical Mechanics workshop in honor of Attilio Stella's 60^{th} birthday, Venice, Italy, Aprile 2009 - invited talk

Mathematical models in life and social sciences, L'Aquila, Italy, Luglio 2008 - invited talk

Centro oli - per una valutazione degli impatti, Pescara, Italy, Luglio 2008 - invited talk

AIMS seventh international conference on dynamical systems, differential equations and applications, Arlington, TX Maggio 2008 - invited talk

IPAM Optimal Transport, Los Angeles, CA, Marzo-Giugno 2008

Mathematical Systems Biology Symposium, Irvine, CA, Febbraio 2008

Biophysical society meeting, Long Beach, CA, Febbraio 2008

Dynamics Days, Knoxville, TN, Gennaio 2008 - invited talk

SIAM conference on dynamical systems, Snowbird UT, Maggio 2007 - invited talk

International Conference on Robot Automation ICRA 2007, Rome, Italy, Aprile 2007

IPAM Random Shapes, Los Angeles, CA, Marzo-Giugno 2007

Expanders and self-assembly, Hewlett Packard Palo Alto, CA, Novembre 2006 - invited talk

Swarming by nature and by design, Los Angeles, CA, Febbraio 2006 - invited talk

Nonlinear control, Pasadena, CA, Novembre 2005 - invited talk

Multi-scale analysis and computation, Los Angeles, CA, Novembre 2005 - invited talk

Device applications of non-linear systems, Catania, Italy, Ottobre 2005 - invited talk

SIAM Dynamical systems, Snowbird, UT, Maggio 2005 - invited talk

IPAM Cells and Materials, Los Angeles, CA, Marzo-Giugno 2006

Understanding complex systems, Urbana-Champaign, IL, Maggio 2006

Dynamics days, Bethesda, MD, Gennaio 2006

Conference on statistics, mathematics and related fields, Honolulu, HI, Gennaio 2006

Gordon research conference on non-linear systems, Waterville, ME, Luglio 2005

Biophysical society meeting, Long Beach, CA, Febbraio 2005
StatPhys 22, Bangalore, India, Luglio 2004
Gordon research conference on colloids, Ventura, CA, Febbraio 2002
DNA charge transfer workshop, Los Angeles, CA, Settembre 2001
Physics electronics conference, State College, PA, Giugno 1998
American physical society, Various locations, 1998-presente

Insegnamento:

Titolare, Dipartimento di Matematica CSUN, 2007-presente
Sust 300: Interdisciplinary perspectives on sustainability
Math 140: Introductory statistics
Math 150A: Calculus I Math 150B: Calculus II
Math 250: Calculus III Math 351: Differential equations
Math 592C: Mathematical biology, graduate class

Titolare, Sessione Estiva CSUN, 2007
PUMP lecturer

Titolare, Dipartimento di Matematica UCLA, 2004-2007
Biomath 201: Deterministic models in biology, graduate class
Math 142: Math modeling, upper division Math 31B: Calculus
Math 151a Applied Numerical Methods I, upper division

Assistente, Dipartimento di Fisica UCLA Inverno 2000 - Primavera 2003
Meccanica Razionale, Meccanica Quantistica, Fisica I e II

Fondi ricerca:

National Science Foundation DMS-0719462 2007-2011, PI $118K
Stochastic models of viral adsorption, fusion and replication

National Science Foundation DMS-1021850 2010-2014, PI $106K
Hierarchical kinetic models for chemically and hydrodynamically coupled organisms

Multi-disciplinary University Research Initiative (MURI - ARO) - 2011-2016, CoPI
Scalable, stochastic and spatiotemporal game theory for real world human adversarial behavior - awarded $580K (per CoPI)

National Science Foundation DUE-0969627 2010-2013, Senior Personnel
Students Targeting Engineering and Physical Science

Army Research Office, PI W911NF-14-1-0472 2014-2017 $535K
Warfighter neuroendocrinology - modeling stress response, PTSD and TBI