

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

Academic Employment:

Professor, Mathematics Department CSUN 2007 - present
Adjunct Professor, Computational Medicine UCLA 2012 - present
Professor, Institute for Sustainability CSUN 2008 - present

Research interests:

Quantitative modeling, data analysis, numerical simulations of biological, psychological and social systems.

Education:

Postdoctoral Scholar, Mathematics Department UCLA, 2004 - 2007
Swarming many-body systems in biology and robotics. Ligand-receptor binding in biology
Postdoctoral Scholar, Chemical Engineering Department Caltech, 2003 - 2004
Lattice models and Monte-Carlo simulations of water molecules and biological membranes
Ph.D. Physics University of California at Los Angeles, 2003
Charge transfer in DNA: the role of thermal fluctuations and of symmetry
M.A. Physics, University of Maryland at College Park, 1998
Unified treatment of step-edge fluctuations: limiting cases and crossover behavior
Baccalaureate, Physics, University of Padova, Italy, 1996
Directed paths in random media, discontinuous depinning from rough substrates
Summa cum laude

Professional service and associations:

Referee for the National Science Foundation, National Academy of Sciences, Physical Review, Netherlands Organisation for Scientific Research, SIAM, IEEE Conference Proceedings, Springer Verlag, Physica A and D, European Physical Journal, Journal of Statistical Physics, Journal of Non-Linear Science, Physics Letters A, International Journal of Control, Differential Equations and Dynamical Systems, Current Opinion in Systems Biology, PLoS, Journal of Offender Rehabilitation, Advances in Difference Equations, Applied Mathematics and Computation

Member of the APS, SIAM, BPS, AMS

Found novel integral series, listed in 'Table of Integrals, Series and Products,' 7th edition and on Mathworld (<http://mathworld.wolfram.com/Erf.html>)

Associate Director, Institute for Pure and Applied Math, UCLA 2018 - 2021

Author of the TED-ED video "Why do animals form swarms?" with 300K visualizations

Author of an environmental column on 'Il Fatto Quotidiano,' Italy, daily circulation 70K

Publications - in press and preparation:

77. *Efficient portfolio selection through preference aggregation with Quicksort and the Bradley Terry model*, Y Ge, L Bottcher, T Chou, MR D’Orsogna, submitted (2025)
76. *A knapsack for collective decision-making*
Y Ge, L Bottcher, T Chou, MR D’Orsogna, submitted (2024)
75. *Aggregating multiple test results to improve medical decision-making*
L. Bottcher, MR D’Orsogna, T Chou, PLoS Computational biology, in press (2024)
74. *Mean first passage times for transport equations*
T Hillen, MR D’Orsogna, J Mantoath, A Lindsay, SIAM Journal on Applied Mathematics, in press (2024)
73. *A probabilistic model of relapse in drug addiction*
S Mao, T Chou, MR D’Orsogna, Mathematical Biosciences **372** 109184 (2024)
72. *Forecasting drug overdose mortality by age in the United States at the national and county levels*, MR D’Orsogna, L Bottcher, T Chou, PNAS Nexus **3** 1–17 (2024)
71. *Homicide and criminal careers: An empirical study on serial murderers*
G Campedelli, MR D’Orsogna, Homicide Studies, Routledge 323-348 (2024)
70. *Modeling and forecasting age-specific overdose mortality in the United States*
MR D’Orsogna, L Bottcher, T Chou, European Physical Journal **232** 1743–1752 (2023)
69. *Fentanyl-driven acceleration of racial, gender and geographical disparities in drug-overdose deaths in the United States*
MR D’Orsogna, L Bottcher, T Chou, PLoS Global Public Health **3** e0000769 (2023)
68. *Clonal abundance patterns in hematopoiesis: Mathematical modeling and parameter estimation*
Y. Pan, MR D’Orsogna, M. Tang, T. Stiehl, T. Chou, Frontiers in Systems Biology **3** 893366 (2023)
67. *A mathematical model of reward-mediated learning in drug addiction*
MR D’Orsogna, T Chou, Chaos **32** 021102 (2022)
66. *How naive T-cell clone counts are shaped by heterogeneous thymic output and homeostatic proliferation* R Dessalles, Y Pan, M Xia, D Maestrini, MR D’Orsogna, T Chou, Frontiers in Immunology **12** 735135 (2022)
65. *A statistical model of COVID-19 testing: effects of sampling bias and testing errors*
L. Bottcher, MR D’Orsogna, T Chou, Philosophical Transactions A **380** 0121 (2021)
64. *Fighting Big Oil in Italy: Social media and civic activism*, MR D’Orsogna, in ‘Urban Networks. People. Technologies. Governance’, 180-205, edited by E. Lapina-Kratasyuk, O. Zaporozhets, A. Vozyanov, Novoe Literaturnoe Obozrenie, Moscow, Russia (2021)
63. *Mathematische Modellierung von Radikalisierungsprozessen* Y Chuang, MR D’Orsogna, in ‘Erfolgsformeln’, 89–92, edited by M Ehrhardt, M. Günther and W. Schilders, Verlag & Druck, Hertogenbosch, The Netherlands (2021)
62. *Zuwanderung und Integration in sich verändernden Gesellschaften* Y Chuang, MR D’Orsogna, in ‘Erfolgsformeln’, 84–88, edited by M Ehrhardt, M. Günther and W. Schilders, Verlag & Druck, Hertogenbosch, The Netherlands (2021)

61. *Verbrechen durch Mathematik verstehen* Y Chuang, MR D’Orsogna, in ‘Erfolgsformeln’, 154–157, edited by M Ehrhardt, M. Günther and W. Schilders, Verlag & Druck, Hertogenbosch, The Netherlands (2021)
60. *Impacts of California Proposition 47 on crime trends in the city of Santa Monica* J Crodelle, C Vallejo, M Schmidtchen, C Topaz, MR D’Orsogna, PLoS One **16** e0251199 (2021)
59. *Temporal clustering of disorder events during the COVID-19 pandemic* G Campedelli, MR D’Orsogna, PLoS One **16** e0250433 (2021)
58. *Mathematical modeling of depressive disorders: circadian driving, bistability and dynamical transitions* X Cheng, MR D’Orsogna, T Chou, Comp Struct Biotech J **19** 664–690 (2021)
57. *Stochastic model of randomly end-linked polymer network micro-regions* S Norris, A Kasko, T Chou, MR D’Orsogna, Macromolecules **54** 126–142 (2021)
56. *Using excess deaths and testing statistics for accurate estimates of COVID-19 mortalities* L. Bottcher, MR D’Orsogna, T Chou, Euro J Epidemiology, (2021)
55. *Moth mating: Modeling female pheromone calling and male navigational strategies to optimize reproductive success* T Stepien, C Zmurchok, J Hengenius, R Caja-Rivera, MR D’Orsogna, A Lindsay, Applied Sciences **10** 6543 (2020)
54. *A network model of immigration and coexistence* Y Chuang, T Chou, MR D’Orsogna, SIAM News **53** 1–2 (2020)
53. *Local alliances and rivalries shape near-repeat terror activity of al-Qaeda, ISIS, and insurgents* Y Chuang, N Ben-Asher, MR D’Orsogna, PNAS **116** 20898–20903 (2019)
52. *Mathematical models of radicalization and terrorism* Y Chuang, MR D’Orsogna, in ‘Understanding crime through science’ edited by N. Derzsy, Springer International, New York (2019)
51. *A network model of immigration: Enclave formation vs. cultural integration* Y Chuang, T Chou, MR D’Orsogna, Networks and Heterogeneous Media, **14** 53-77 (2019)
50. *Exact steady-state distributions of multispecies birth-death-immigration processes: Effects of mutations and carrying capacity on diversity* R Dessalles, MR D’Orsogna, T Chou, J Stat Phys **173** 182–221 (2018)
49. *The effects of statistical multiplicity of infection on virus quantification and infectivity assays* B Mistry, MR D’Orsogna, T Chou, Biophys J **114** 2974–2985 (2018)
48. *Age-structured social interactions enhance radicalization* Y Chuang, T Chou, MR D’Orsogna, J Math Sociol, **42** 128–151 (2018)
47. *Perturbing the neuroendocrine stress system: modeling HPA axis to improve diagnosis and quantification of PTSD and related stress disorders* L Kim, MR D’Orsogna, T Chou, Comp Psych **13** 1–22 (2017)
46. *Phthalates, heavy metals and PAHs in an overpopulated coastal region: Inferences from Abruzzo, central Italy* F Stoppa, M Schiazza, J Pellegrini, F Ambrosio, G Rosatelli, MR D’Orsogna, Mar Poll Bull **125** 501–512 (2017)
45. *Modeling radicalization: how small violent fringe sects develop into large indoctrinated societies* M Short, S McCalla, MR D’Orsogna, Royal Soc Open Sci **4** 170678 (2017)

44. *Kinetic models for the sensitivity of HIV entry to receptor and coreceptor concentrations*
B Mistry, MR D’Orsogna, N Webb, B Lee, T Chou, J Phys Chem B **120** 6189–6199 (2016)
43. *A bistable belief dynamics model for radicalization within sectarian conflict*
Y Chuang, MR D’Orsogna, T Chou, Quart Appl Math **75** 19–37 (2016)
42. *Swarming in viscous fluids: Three-dimensional patterns in swimmer and force induced flows*
Y Chuang, T Chou, MR D’Orsogna, Physical Review E **93** 043112 (2016)
41. *Onset, timing and exposure therapy of stress disorders: mechanistic insight from a mathematical model of oscillating neuroendocrine dynamics*
L Kim, M R D’Orsogna and T Chou, Biol Direct **11** 1–18 (2016)
40. *Growth and containment of a hierarchical criminal network*
C Marshak, M Rombach, A Bertozzi, MR D’Orsogna, Physical Review E **93** 022308 (2016)
39. *Crime, punishment and evolution in an adversarial game*
M McBride, R Kendall, MR D’Orsogna, M Short, Euro J Appl Math **10:1017** 1–21 (2015)
38. *First assembly times and equilibration in stochastic coagulation-fragmentation*
MR D’Orsogna, Q Lei, T Chou, Journal of Chemical Physics **139** 014112 (2015)
37. *Physics for better human societies*
MR D’Orsogna, M Perc, Phys Life Rev **12** 40 (2015)
36. *Statistical physics of crime: A review*
MR D’Orsogna, M Perc, Phys Life Rev **12** 1-21 (2015)
35. *Hydrocarbon contamination in sediments of the Pertusillo freshwater reservoir, Val d’Agri Southern Italy*, A Colella, MR D’Orsogna, Fresenius Env Bull **23** 3286–3295 (2014)
34. *First passage problems in biology* T Chou, MR D’Orsogna, in "First-passage phenomena and their application," 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, MR D’Orsogna, PLoS One **9** e85531 (2014)
32. *Combinatoric and mean-field analysis of heterogeneous self-assembly*
B Zhao, B Berenji, T Chou, MR D’Orsogna, J Chem Phys **139** 121918 (2013)
31. *Criminal defectors lead to the emergence of cooperation in an experimental, adversarial game*
MR D’Orsogna, M McBride, R Kendall, 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, MR D’Orsogna, Euro J Appl Math **24** 131–159 (2013)
29. *Territorial developments based on graffiti: a statistical mechanics approach*
A Barbaro, L Chayes, MR D’Orsogna, Physica A **392** 252–270 (2013)
28. *First passage times in homogeneous nucleation and self-assembly*
R Yvinec, MR D’Orsogna, T Chou, J Chem Phys **137** 244107 (2012)
27. *Desert locust dynamics: Behavior phase change and swarming*
C Topaz, MR D’Orsogna, L Keshet, A Bernoff, PLoS Computational Biology **8** e1002642 (2012)
26. *Stochastic self-assembly of incommensurate clusters*

- MR D’Orsogna, G Lakatos, T Chou, J Phys Chem **136** 084110 (2012)
25. *Coarsening and accelerated equilibration in mass-conserving heterogeneous nucleation*
T Chou, MR D’Orsogna, Physical Review E **84** 011608 (2011)
24. *Cooperation and punishment in an adversarial game: How defectors pave the way to peaceful society* M Short, J Brantingham, MR D’Orsogna, Physical Review E **82** 066603 (2010)
23. *Diffusion-dependent mechanisms of receptor engagement and viral entry*
M Gibbons, T Chou, MR D’Orsogna, J Phys Chem B **114** 15403–15412 (2010)
22. *Arrival times in a zero-range process with injection and decay*
B Shargel, MR D’Orsogna, T Chou, Journal of Physics A **43** 305003 (2010)
21. *Optimal transport and apparent drug resistance in viral infections*
MR D’Orsogna, T Chou, PLoS One **4** e8165 (2009)
20. *Enhancement of cargo processivity by cooperating molecular motors*
F Posta, MR D’Orsogna, T Chou, Phys Chem Chem Phys **11** 4851–4860 (2009)
19. *Double milling in self-propelled swarms from kinetic theory*
J Carrillo, MR D’Orsogna, V Panferov, Kin Rel Mod **2** 363–378 (2009)
18. *Measuring and modeling repeat and near-repeat burglary effects*
M Short, MR D’Orsogna, G Tita, J Brantingham, Journal of Quantitative Criminology **25** 325–339 (2009)
17. *A statistical model of criminal behavior* M Short, MR D’Orsogna, V Pasour, G Tita, P Brantingham, A Bertozzi, L Chayes, Math Mod Meth Appl Sci **18** 1249–1267 (2008)
16. *Multi-stage adsorption of diffusing macromolecules and viruses*
T Chou, MR D’Orsogna, J Chem Phys **127** 105101 (2007)
15. *State transitions and the continuum limit for interacting, self-propelled particles*
Y Chuang, MR D’Orsogna, D Marthaler, A Bertozzi, L Chayes, Physica D **232** 33–47 (2007)
14. *Exact steady states for translocation ratchets driven by random sequential adsorption*
MR D’Orsogna, T Chou, T Antal, Journal of Physics A **40** 5575–5584 (2007)
13. *Multi-vehicle flocking: Scalability of cooperative control algorithms using pairwise potentials*
Y Chuang, Y Huang, MR D’Orsogna, A Bertozzi, Proceedings from the IEEE International conference on robotics and automation, 2292–2299 (2007)
12. *Self-propelled particles with soft-core interactions: patterns, stability and collapse.*
MR D’Orsogna, Y Chuang, A Bertozzi, L Chayes, Physical Review Letters **96** 104302 (2006)
11. *Pattern formation, stability and collapse in 2D driven particle systems* MR D’Orsogna, Y Chuang, A Bertozzi, L Chayes in ‘Device applications of non linear dynamics,’ edited by A Bulsara, S Baglio (Springer-Verlag, Berlin Heidelberg, 2006)
10. *First passage and cooperativity of queuing kinetics*
MR D’Orsogna, T Chou, Physical Review Letters **95** 170603 (2005)
9. *Interparticle gap distributions on one-dimensional lattices*
MR D’Orsogna, T Chou, J Phys A **38** 531–542 (2005)
8. *Chiral molecule adsorption on helical polymers*

MR D’Orsogna, T Chou, Physical Review E **69** 021805 (2004)

7. *Interplay of chemotaxis and chemokinesis mechanisms in bacterial dynamics*

MR D’Orsogna, M Suchard, T Chou, Physical Review E **68** 021925 (2003)

6. *Charge transfer, symmetry, and dissipation in donor-acceptor molecules*

MR D’Orsogna, R Bruinsma, Physical Review Letters **90** 078301 (2003)

5. *Two-level system with a thermally fluctuating transfer matrix element: Application to the problem of DNA charge transfer* MR D’Orsogna, J Rudnick, Physical Review E **66** 041804 (2002)

4. *Fluctuation-facilitated charge migration along DNA*

R Bruinsma, G Grüner, MR D’Orsogna, J Rudnick, Physical Review Letters **85** 4393–4396 (2000)

3. *Edge diffusion during growth: The kink Ehrlich-Schwoebel effect and resulting instabilities*

O Pierre-Louis, MR D’Orsogna, T Einstein, Physical Review Letters **82** 3661–3664 (1999)

2. *Wetting of rough walls*

A Stella, G Sartoni, G Giugliarelli, M R D’Orsogna, Int J Thermophys **19** 1209–1218 (1998)

1. *Effect of surface roughness on bulk-disorder-induced wetting*

G Sartoni, A Stella, G Giugliarelli, M R D’Orsogna, Europhys Letters **39** 633–638 (1997)

Seminars and colloquia:

Virginia Tech, Mathematics Department, Roanoke VA, Nov 2024

Frankfurt School of Finance and Management, Frankfurt, Germany, Sep 2024

University of Pavia, Mathematics Department, Pavia, Italy, Apr 2024 (virtual)

California State University at Northridge, Los Angeles, Math Open House, Mar 2024

University of California at Los Angeles, Psychology Department, Feb 2024

University of Alberta, Mathematics Department, Mar 2023

University of Alberta, Sustainability Council, Mar 2023

Ryerson University, Mathematics Department, Mar 2022 (virtual)

Frankfurt School of Finance and Management, Frankfurt, Germany, Sep 2021

Delft University of Technology, Mathematical Physics Department, Delft, Netherlands, Sep 2021

Erasmus University, International Institute of Social Sciences, The Hague, Netherlands, Sep 2021

CSU Chico, Mathematics Department, May 2021 (virtual)

University of California at Riverside, Mathematics Department, Apr 2021 (virtual)

University of Oxford, England, Mathematics Department, Mar 2021 (virtual)

MS2 Discovery Institute, Wilfrid Laurier University, Waterloo, Canada, Feb 2021 (virtual)

University of California at Los Angeles, Electrical Engineering Department, Feb 2021 (virtual)

Laboratoire Jacques-Louis Lions, La Sorbonne, Paris, France, Feb 2020

Claremont Center for the Mathematical Sciences, Nov 2019

Claremont Graduate University, Mathematics Department, Oct 2019

RAND Corporation, Santa Monica CA, May 2019

University of Boulder, Colorado, Mathematics Department, Feb 2019

Middlebury Institute of International Studies, Monterey CA, Nov 2018

University of Gothenburg, Sweden, Department of Mathematical Sciences, Oct 2018
 University of Nottingham, UK, School of Mathematical Sciences, Oct 2018
 Edinburgh University, UK, School of Mathematics, May 2018
 Portland Community College, Portland OR, International Women's Day Luncheon, Apr 2018
 University of California at Santa Barbara, Mathematics Department, Mar 2018
 Northern Arizona University, Flagstaff AZ, International Pavilion, Jan 2018
 Arizona State University, Tempe AZ, Institute for Sustainability, Jan 2018
 University of Arizona, Tucson AZ, Mathematics Department, Jan 2018
 University of Arizona, Tucson AZ, School of Natural Resources and the Environment, Feb 2018
 University of Waterloo, Ontario, Canada, Mathematics Department Holiday Lecture, Dec 2017
 University of California at Los Angeles, Biomathematics Department, Apr 2017
 Aberdeen Proving Ground, Aberdeen MD, Apr 2017
 Adelphi Laboratory Center, Adelphi MD, Apr 2017
 University of Padova, Italy, Physics Department, Feb 2017
 University of Pescara, Italy, Economics Department, Feb 2017
 Hong Kong University, Faculty of Education, Hong Kong, China, Dec 2016
 California State University at Northridge, Interdisciplinary Research Institute, Oct 2016
 USC Institute for Creative Technologies, Los Angeles CA Sep 2016
 Ecole Polytechnique de Montreal, Montreal, Quebec, Canada, Sep 2016
 Institut national de la recherche scientifique, Varennes, Quebec, Canada Sep 2016
 UNAM, Physical Sciences Department, Mexico City, Mexico Jun 2016
 IBM Research Center, Almaden CA, Dec 2015
 RAND Corporation, Santa Monica CA, Nov 2015
 Kavli Institute for Theoretical Physics, Santa Barbara CA, Dec 2015
 Harvey Mudd, Claremont CA, Biology Department, Jun 2015
 University of Pescara, Italy, Economics Department, May 2015
 University of Chieti, Italy, Geology Department, Dec 2014
 Georgia Institute of Technology, Atlanta GA, Mathematics Department, Oct 2014
 University of Maribor, Slovenia, Physics Department, Apr 2014
 Case Western University, Cleveland OH, Mathematics Department, Apr 2014
 Université Pierre et Marie Curie, Paris, France, Mathematics Department, Mar 2014
 University of North Carolina at Chapel Hill, Raleigh NC, Mathematics Department, Feb 2014
 University of Colorado, Boulder CO, Mathematics Department, Oct 2013
 University of Cagliari, Italy, Biochemistry Department, Jun 2013
 University of Vienna, Austria, Mathematics Department, Jun 2012
 University of Graz, Austria, Mathematics Department, Jun 2012
 California Nanoscience Initiative, University of California at Santa Barbara, Feb 2012
 University of California at Los Angeles, Biomathematics Department, Feb 2012

University of California at Riverside, Mechanical Engineering Department, Nov 2011
 University of California at Santa Barbara, Mathematics Department, Feb 2011
 University of Pescara, Italy, Economics Department, Dec 2010
 University of Padova, Italy, Physics Department, Jun 2009
 Centre de Recerca Matemàtica, Barcelona, Spain, Mathematics Department, Jun 2009
 University of California at Los Angeles, Mechanical Engineering Department, May 2008
 University of California at Riverside, Physics Department, Feb 2008
 University of California at Los Angeles, Biomathematics Department, Nov 2007
 University of British Columbia, Vancouver, Canada, Mathematics Department, Oct 2007
 University of Alberta, Canada, Mathematics Department, Jan 2007
 California State University at Northridge, Mathematics Department, May 2007
 Purdue University, West Lafayette IN, Physics Department, Mar 2007
 Virginia Tech, Roanoke VA, Engineering and Applied Math Department, Mar 2007
 University of South Florida, Tampa FL, Physics Department, Mar 2007
 University of California at Merced, Math Department, Feb 2007
 University of Virginia, Physics Department, Feb 2007
 University of Michigan at Ann Arbor, Physics Department, Jan 2007
 Claremont Graduate University, Claremont CA, Mathematics Department, Dec 2006
 Carnegie Mellon University, Pittsburg PA, Physics Department, Nov 2006
 George Mason University, Fairfax VA, Physics Department, May 2006
 University of Rome La Sapienza, Italy, Physics Department, Mar 2006
 University of California at Los Angeles, Math Department, May 2005
 University of California at Los Angeles, Chemistry Department, Apr 2005
 University of Amsterdam, The Netherlands, Physics Department, Mar 2005
 Caltech, Pasadena CA, Chemistry Department, Feb 2003
 University of California at San Diego, Physics Department, Feb 2003
 University of Padova, Italy, Physics Department, Jun 2002
 University of Maryland, College Park MD, Physics Department, Sep 1998

Conferences, Programs and Invited Talks (IT):

(IT) Society for Mathematical Biology annual meeting, Seoul, Korea, Jul 2024
 (IT) SIAM conference on the life sciences, Portland, OR Jun 2024
 (IT) Ising Lectures, Kiev, Ukraine, May 2024 (virtual)
 (IT) Forecasting heuristics in infectious-disease surveillance, Frankfurt, Germany, Feb 2024 (virtual)
 (IT) Modeling, analysis, and control of multi-agent systems across scales, Pisa, Italy, Jan 2024
 (IT) Predictive modeling in biology and medicine, University of California at Riverside, Nov 2023
 (IT) SIAM Great Lakes, PDE models in mathematical biology, Lansing, MI Oct 2023
 Santa Fe Institute Collective Intelligence Symposium, Santa Fe, NM June 2023
 (IT) SIAM conference on dynamical systems, Portland, OR May 2023

(IT) Virginia Environmental Justice Summit, George Mason University, VA Mar 2023

(IT) Joint mathematical meetings of the MAA and AMS, Boston MA, Jan 2023

(IT) Society for Mathematical Biology annual meeting, Heidelberg, Germany, Sep 2022

(IT) Reconstructing network dynamics from data: Applications to neuroscience and beyond, IPAM, CA Aug 2022

(IT) CIMPA Summer School, Mathematics of climate science, Kigali, Rwanda, Jul 2021 (virtual)

(IT) Joint mathematical meetings of the MAA and AMS, Washington DC, Jan 2021 (virtual)

(IT) Workshop on analysis and its applications in biology and physiology, National Center for Theoretical Sciences, Taipei, Taiwan, Jan 2020

Joint mathematical meetings of the MAA and AMS, Denver CO, Jan 2020

(IT) Workshop on interdisciplinary topics in Statistical Physics, Padova, Italy, Sep 2019

Applied math modeling with topological techniques, Brown University, Providence RI, Aug 2019

(IT) Society for Mathematical Biology annual meeting, Montreal, Canada, Jul 2019

(IT) CIMPA Summer School, Mathematical models in biology and related applications of partial differential equations, La Habana, Cuba, Jun 2019

(IT) SIAM conference on dynamical systems, Snowbird, UT, May 2019

(IT) Science of dreams: Blending qualitative theories with the latest advancements in data and neuroscience, UCLA, Apr 2019

(IT) Mathematical criminology and security, Banff, Canada, Mar 2019

Joint mathematical meetings of the MAA and AMS, Baltimore MD, Jan 2019

(IT) Canadian Mathematical Society Winter Meeting, Vancouver BC Dec 2018

(IT) Semana de la Complejidad, Centro de Ciencias de la Complejidad, Mexico City, Mexico, Nov 2018

(IT) Institut Mittag-Leffler, Mathematical Biology, Djursholm, Sweden, Oct 2018

(IT) Agent-based modeling in the life sciences, SIAM Meeting, Minnesota MN, Aug 2018

(IT) NASA, NGSS, and the health of planet Earth, JPL, Pasadena CA, Jul 2018

(IT) Agent-based modeling in biological and social systems, Mathematics Research Community, Whispering Pines RI, Jun 2018

(IT) Collective dynamics and self-organization in biology, Edinburgh, Scotland, May 2018

(IT) 10th International conference on climate change, University of California at Berkeley, Apr 2018

(IT) Climate action panel, University of California at Irvine, Jan 2018

Joint mathematical meetings of the MAA and AMS, San Diego CA, Jan 2018

(IT) Cultural analytics at IPAM, Lake Arrowhead CA, Dec 2017

(IT) Mathematical models of biophysical phenomena, Rio de Janeiro, Brazil, Dec 2017

National Academies Keck futures initiatives beyond boundaries, Irvine CA Nov 2017

(IT) Association for the advancement of sustainability in higher education conference, San Antonio TX, Oct 2017

(IT) NATO advanced research workshop, Odessa, Ukraine Sep 2017

(IT) The Fields institute for research in mathematical sciences, Multi-scale modeling of wave structures in tissues, Toronto, Canada Sep 2017

(IT) Society for mathematical biology annual meeting, Salt Lake City, UT Jul 2017

(PT) NetCrime 2017, Indianapolis, IN Jun 2017 – plenary talk

SIAM conference on dynamical systems, Snowbird, UT May 2017

Regulatory and epigenetic stochasticity in development and disease, IPAM, CA Mar 2017

(IT) Mathematical modeling and computation in medicine and biology, Sanya, China Dec 2016

(IT) European conference on mathematical and theoretical biology, Nottingham, UK July 2016

(IT) 11th AIMS conference on dynamical systems, differential equations and applications, Orlando, FL Jul 2016

(IT) Coherent structures in PDEs and their applications, Oaxaca, Mexico Jun 2016

(IT) Fluctuation-driven phenomena in biological systems, Warwick, UK Apr 2016

Cultural analytics, IPAM, CA Mar 2016 – tutorial lecture

(IT) Schloss Dagstuhl Leibniz-Zentrum für Informatik, Germany Oct 2015

(IT) Living systems: from interaction patterns to critical behavior, Venice, Italy Sep 2015

(IT) Equadiff, Lyon, France Jul 2015

(IT) SIAM conference on dynamical systems, Snowbird UT, May 2015

Institute for mathematics and its applications St. Paul MN, Apr 2015

National academies Keck futures initiatives on collective behavior Irvine CA, Nov 2014

Kavli institute for theoretical science Santa Barbara, CA Jul–Aug 2014

(IT) 7th international conference on biomathematics and ecology, Claremont CA, Oct 2014

(IT) 10th AIMS conference on dynamical systems, differential equations and applications, Madrid, Spain, Jul 2014

(IT) AMS sectional meeting, Albuquerque NM, Apr 2014

Materials for a sustainable future, IPAM, CA Sep–Dec 2013

(IT) SIAM annual meeting San Diego CA, Jul 2013

(IT) Indo-American frontiers of science symposium Agra, India Apr 2013

(IT) Mathematical models and modeling of biophysical phenomena, Rio de Janeiro, Brazil, Mar 2013

(IT) 3rd workshop on analysis and modeling of security, Santiago, Chile Jan 2013

(IT) Workshop on computational criminology, Vancouver, BC Sep 2012

(IT) Modeling of Complex Social Systems 5th, Simon Fraser University, Vancouver BC, Sep 2012

(IT) 9th AIMS conference on dynamical systems, differential equations and applications, Orlando FL, Jul 2012 – two invited talks

(IT) SIAM conference on nonlinear waves and coherent structures, Seattle WA, Jun 2012

Game theory for security, sustainability and health, Stanford, Palo Alto CA, Mar 2012

(IT) 10th International conference on operations research, L'Havana, Cuba, Mar 2012

(IT) Emergent behaviour in multi-particle systems with non-local interactions, Banff, Canada, Jan 2012

Mathematical theory and simulation of phase transitions, Beijing, China, Nov 2011

Physical sciences in oncology, USC, Los Angeles CA, Oct 2011

New questions in probability theory arising in biological systems, MBI, Columbus OH, Sep 2011
 (IT) International congress on industrial and applied mathematics, Vancouver, Canada, Jul 2011
 (IT) Foundations of computational mathematics, Budapest, Hungary, Jul 2011
 (IT) Mathematical methods and modeling of biophysical phenomena, Foz do Iguacu, Brazil, Mar 2011
 Insect self-organization and swarming, MBI, Columbus, OH Mar 2011
 Systems biology conference, University of California at Irvine, CA, Jan 2011
 In the light of evolution: Cooperation, National Academy of Sciences Irvine, CA Jan 2011
 (IT) AMS sectional meeting - Los Angeles CA, Oct 2010
 (IT) 8th conference of numerical analysis and applied mathematics, Rhodes, Greece, Sep 2010
 (IT) CAIMS - Dynamical systems, St. John's, Canada, July 2010
 (IT) SIAM Emerging topics in dynamical systems and partial differential equations Barcelona, Spain, May 2010
 (IT) AMS Pattern formation in biological systems, St. Paul, MN Apr 2010
 (IT) 9th International conference on PDEs and mathematical biology, L'Havana, Cuba, Feb 2010
 (IT) SIAM Analysis of partial differential equations Miami, FL Dec 2009
 (IT) Kinetic and mean-field models in the socio-economic sciences, Edinburgh, Scotland, Jul 2009
 (IT) Deterministic and stochastic modeling in computational neuroscience and biology, Barcelona, Spain, May 2009
 (IT) Statistical mechanics workshop in honor of A Stella's 60th birthday, Venice, Italy, Apr 2009
 (IT) Mathematical models in life and social sciences, L'Aquila, Italy, July 2008
 (IT) 7th International conference on dynamical systems, differential equations and applications, Arlington, TX May 2008
 Optimal transport, IPAM CA, Mar–Jun 2008
 Mathematical systems biology symposium, University of California at Irvine CA, Feb 2008
 Biophysical society meeting, Long Beach, CA, Feb 2008
 (IT) Dynamics days, Knoxville, TN, Jan 2008
 (IT) SIAM conference on dynamical systems, Snowbird UT, May 2007
 International conference on robot automation ICRA 2007, Rome, Italy, Apr 2007
 Random shapes, IPAM CA, Mar–Jun 2007
 (IT) Expanders and self-assembly, Hewlett Packard Palo Alto, CA, Nov 2006
 Understanding complex systems, Urbana-Champaign IL, May 2006
 Cells and materials, IPAM CA, Mar–Jun 2006
 (IT) Swarming by nature and by design, IPAM CA, Feb 2006
 Dynamics days, Bethesda MD, Jan 2006
 Conference on statistics, mathematics and related fields, Honolulu HI, Jan 2006
 (IT) Nonlinear control, Caltech, Pasadena CA, Nov 2005
 (IT) Multi-scale analysis and computation, University of California at Los Angeles CA, Oct 2005
 (IT) Device applications of non-linear systems, Catania, Italy, Oct 2005
 Gordon research conference on non-linear systems, Waterville ME, Jul 2005

(IT) SIAM Dynamical systems, Snowbird UT, May 2005
 Biophysical society meeting, Long Beach CA, Feb 2005
 StatPhys 22, Bangalore, India, Jul 2004
 Gordon research conference on colloids, Ventura CA, Feb 2002
 DNA charge transfer workshop, UCLA, Nov 2001
 Physics electronics conference, State College PA, Jun 1998
 American physical society, Various locations, 1998–present

Teaching experience:

Lecturer, Math Department CSUN, 2007–present

Sust 300: Interdisciplinary perspectives on sustainability
 Math 140: Introductory statistics
 Math 150A, 150B: Calculus I, Calculus II
 Math 250: Calculus III
 Math 351: Differential equations
 Math 592C: Mathematical biology (graduate class)

Lecturer, Math Department UCLA, 2004–2007

Biomath 201: Deterministic models in biology (graduate class)
 Math 142: Math modeling (upper division)
 Math 134: Non-linear dynamics and chaos (upper division)
 Math 31B: Calculus
 Math 151a Applied Numerical Methods I (upper division)

Organizer and IPAM Associate Director activities:

Collective social phenomena: Dynamics and data, Casa Matemática Oaxaca
 Oaxaca, Mexico, Jun 2025 (workshop organizer)
 From data to diagnosis: Advancements in prevalence estimation and testing,
 SIAM conference on the life sciences, Portland, OR, Jun 2024 (mini-symposium organizer)
 Mathematical modeling of psychiatric disorders and addiction, 12th European conference in
 mathematical and theoretical biology, Heidelberg, Germany, Sep 2022 (mini-symposium organizer)
 Reconstructing network dynamics from data: Applications to neuroscience and beyond, IPAM
 workshop, Sep 2022
 Quantum numerical linear algebra, IPAM workshop, Feb 2022
 Mathematics of intelligence, IPAM workshop, Feb 2022
 Calculus of variations in probability and geometry, IPAM workshop, Jan 2022
 Tensor methods and emerging applications to the physical and data sciences, IPAM long
 program, Spr 2021
 Deep learning and combinatorial optimization, IPAM workshop, Feb 2021
 Entropy inequalities, quantum information and quantum physics, IPAM workshop, Feb 2021

Actions of tensor categories on C^* -algebras, IPAM workshop, Jan 2021
 High-dimensional Hamilton Jacobi PDE-s, IPAM long program, Spr 2020
 Computational psychiatry, IPAM workshop, Feb 2020 (organizer)
 Asymptotic algebraic combinatorics, IPAM workshop, Feb 2020
 Deep learning and medical applications, IPAM workshop, Jan 2020
 Emerging opportunities in mathematics and microbiome, IPAM workshop, Jan 2020
 Quantum linear algebra, IPAM reunion, Dec 2019
 Applied mathematical modeling with topological techniques, ICERM workshop, Brown University, Providence RI, Aug 2019 (organizer)
 Collaborative workshop for women in mathematical biology, IPAM workshop, Jun 2019
 Geometry and learning from data in 3D and beyond 2019, IPAM long program, Spring 2019
 Operator theoretic methods in dynamic data analysis and control, IPAM workshop, Feb 2019
 Computational challenges in gravitational wave astronomy, IPAM workshop, Jan 2019
 Women in mathematics and public policy, IPAM workshop, Jan 2019
 Agent-based modeling in biological and social systems, Mathematics Research Communities AMS, Whispering Pines RI, Jun 2018 (workshop organizer)
 Mechanisms, diagnosis, and treatment of depressive disorders, SIAM Dynamical Systems, Snowbird UT, May 2017 (mini-symposium organizer)

Large Grants awarded:

ARO 2023–2026 (PI) Modeling and data analysis of the drivers of discontent, social cohesion, and resilient decision-making, \$600K
 NSF 2023–2026 (co-PI) Acquisition of a high-performance computer cluster for computational biology, \$730K
 NASA 2019–2024 (co-I) Autonomy Research Center for STEM, \$3M
 NSF 2019–2024 (co-PI) Institute for Pure and Applied Mathematics Renewal, \$25M
 Fondation Maison des Sciences de l'Homme, 2019–2020 (co-PI) The Leonardo Project, \$20K
 ARO 2018–2024 (PI) Mathematical modeling of limbic system dynamics, pathophysiology, and response to stress \$630K
 NSF 2018–2022 (PI) Understanding generation, maintenance, and dynamics of immune diversity via clone-count models, \$103K
 ARO 2017–2020 (PI) Predicting and managing migrant flows: insights from game theoretic, age dependent and networked mathematical models, \$375K
 ARO 2014–2017 (PI) Warfighter neuroendocrinology: modeling stress response, PTSD and traumatic brain injury, \$535K
 ARO MURI 2011–2016 (co-PI) Scalable, stochastic and spatiotemporal game theory for real world human adversarial behavior, \$580K
 NSF 2010–2014 (PI) Hierarchical kinetic models for chemically and hydrodynamically coupled organisms, \$106K

NSF 2007–2011 (PI) Stochastic models of viral adsorption, fusion and replication, \$118K