JOSÉ ANTONIO CARRILLO DE LA PLATA

EDUCATION: Ph.D. in Mathematics, University of Granada, May 1996

CURRENT POSITION: Professor of the Analysis of Nonlinear Partial Differential Equations, Mathematical Institute, University of Oxford. Tutorial Fellow in Applied Mathematics, The Queen's College.

EXTERNAL POSITION

Chairman	Applied Mathematics Committee European Mathematical Society	2014 - 2017

PREVIOUS POSITIONS

Lecturer	University of Texas at Austin	September 1998 - May 2000
Associate Prof.	University of Granada	January 2000 - March 2003
ICREA Research Prof.	Univ. Autònoma de Barcelona	March 2003 - September 2012
Chair in Applied and Numerical Analysis	Imperial College London	October 2012 – March 2020

VISITING AND RESEARCH POSITIONS

Core participant	Program on Optimal Transport IPAM, UCLA	Jan. 2008 - June 2008
Visiting Professor	Norwegian Academy of Science and Letters, Oslo	Sept.-Oct. 2008
Visiting Professor	National University of Singapore	August 1-31, 2009
Visiting Professor	CEREMADE, Université Paris-Dauphine, Paris	February 2010
Visiting Professor	Newton Institute, Cambridge, United Kingdom	August-December 2010
Visiting Professor	Université Paris-Orsay	June 2012
Visiting Professor	MSRI, University of California at Berkeley	August-October 2013
Visiting Professor	Tsinghua University, Beijing	July-August 2015
Visiting Scholar	Mittag-Leffler Institute, Sweden	September-December 2016
Visiting Scholar	IMPAN, Warsaw, Poland	March 2017
Visiting Professor	Brown University, USA	August-September 2017
Changjiang Scholar	SWUFE, Chengdu, China	January 2018 – May 2021

AWARDS, PRIZES and MAJOR GRANTS

- SeMA (Sociedad Española de Matemática Aplicada) Young Researcher Prize, 2003.
- Richard von Mises Prize of the International Assoc. of Applied Mathematics and Mechanics-GAMM 2006.
- Royal Society Wolfson Research Merit Award 2012.
- 2016 SACA Award to the best PhD supervision at Imperial College London.
- Elected member of the European Academy of Sciences 2018.
- SIAM Fellow Class 2019.
- Highly Cited Researcher 2015, 2016, 2017, 2018, 2019 and 2020.
- ERC Advanced Grant 2019.

MENTORING: 12 Ph.D. Students and 14 Postdoctoral Fellows Supervised

PUBLICATIONS: Selected List of publications.

1. J. A. Carrillo, Y.-P. Choi, J. Jung, Quantifying the hydrodynamic limit of Vlasov-type equations with alignment and nonlocal forces, to appear in Math. Mod. Meth. Appl. Sci.
2. J. A. Carrillo, R. S. Gvalani, Phase transitions for nonlinear nonlocal aggregation-diffusion equations, to appear in Comm. Math. Phys.
3. J. A. Carrillo, K. Craig, L. Wang, C. Wei, Primal dual methods for Wasserstein gradient flows, to appear in Foundations of Computational Mathematics.
4. J. A. Carrillo, J. Hu, L. Wang, J. Wu, A particle method for the homogeneous Landau equation, J. Comp. Phys. X 7, 100066, 2020.
5. J. A. Carrillo, U. S. Fjordholm, S. Solem, A second-order numerical method for the aggregation equations, Math. Comp. 90, 103–139, 2021.
6. J. A. Carrillo, F. Filbet, M. Schmidtchen, Convergence of a Finite Volume Scheme for a System of Interacting Species with Cross-Diffusion, Numer. Math. 145, 473–511, 2020.
7. J. A. Carrillo, J. Mateu, M.G. Mora, L. Rondi, L. Scardia, J. Verdera, The ellipse law: Kirchhoff meets dislocations, Comm. Math. Phys. 373, 507-524, 2020.
8. J. A. Carrillo, K. Grunert, H. Holden, A Lipschitz metric for the Camassa-Holm equation, Forum of Mathematics, Sigma 8, e27, 2020.
9. J. A. Carrillo, K. Hopf, J. L. Rodrigo, On the singularity formation and relaxation to equilibrium in 1D Fokker-Planck model with superlinear drift, Adv. Math. 360, 106883, 2020.
10. J. A. Carrillo, R. S. Gvalani, G. A. Pavliotis, A. Schlichting, Long-time behaviour and phase transitions for the McKean--Vlasov equation on the torus, Arch. Rat. Mech. Anal. 235, 635-690, 2020.
11. J. A. Carrillo, H. Murakawa, M. Sato, H. Togashi, O. Trush, A population dynamics model of cell-cell adhesion incorporating population pressure and density saturation, J. Theor. Biology 474, 14-24, 2019.
12. J. A. Carrillo, Y.-P. Choi, M. Hauray, S. Salem, Mean-field limit for collective behavior models with sharp sensitivity regions, J. European Math. Soc. 21, 121-161, 2019.
13. J. A. Carrillo, S. Hittmeir, B. Volzone, Y. Yao, Nonlinear Aggregation-Diffusion Equations: Radial Symmetry and Long Time Asymptotics, Inventiones Mathematicae 218, 889-977, 2019.
14. J. A. Carrillo, M. G. Delgadino, J. Dolbeault, R. L. Frank, F. Hoffmann, Reverse Hardy-Littlewood-Sobolev inequalities, J. Math. Pure Appl. 132, 133–165, 2019.
15. J. A. Carrillo, Y.-P. Choi, O. Tse, Convergence to Equilibrium in Wasserstein distance for damped Euler equations with interaction forces, Comm. Math. Phys. 365, 329-361, 2019.
16. J. A. Carrillo, K. Craig, F. S. Patacchini, A Blob Method For Diffusion, Calc. Var. Partial Differential Equations 58, Art. 53, 2019.
17. J. A. Carrillo, A. Wróblewska-Kaminska, E. Zatorska, On long-time asymptotics for viscous hydrodynamic models of collective behavior with damping and nonlocal interactions, Mathematical Models and Methods in the Applied Sciences 29, 31-63, 2019.
18. J. A. Carrillo, Y.-P. Choi, C. Totzeck, O. Tse, An analytical framework for a consensus-based global optimization method, Math. Mod. and Meth. in the Applied Sciences 28, 1037-1066, 2018.
19. M. Bostan, J. A. Carrillo, Reduced fluid models for self-propelled particles interacting through alignment, Mathematical Models and Methods in the Applied Sciences 27, 1255-1299, 2017.
20. J. A. Carrillo, A. Figalli, F. S. Patacchini, Geometry of minimizers for the interaction energy with mildly repulsive potentials, Ann. IHP 34, 1299-1308, 2017.
21. A. B. T. Barbaro, J. A. Cañizo, J. A. Carrillo, P. Degond, Phase Transitions in a kinetic flocking model of Cucker-Smale type, Multiscale Model. Simul. 14, 1063-1088, 2016.
22. J. A. Carrillo, M. G. Delgadino, A. Mellet, Regularity of local minimizers of the interaction energy via obstacle problems, Comm. Math. Phys. 343, 747-781, 2016.
23. J. A. Cañizo, J. A. Carrillo, F. S. Patacchini, Existence of Compactly Supported Global Minimisers for the Interaction Energy, Arch. Rat. Mech. Anal. 217, 1197-1217, 2015.

24. J. A. Carrillo, D. Castorina, B. Volzone, Ground States for Diffusion Dominated Free Energies with Logarithmic Interaction, SIAM J. Math. Anal. 47, 1-25, 2015.
25. D. Balagué, J. A. Carrillo, T. Laurent, G. Raoul, Dimensionality of Local Minimizers of the Interaction Energy, Archive for Rational Mechanics and Analysis 209, 1055-1088, 2013.
26. M. J. Cáceres, J. A. Carrillo, B. Perthame, Analysis of Nonlinear Noisy Integrate & Fire Neuron Models: blow-up and steady states, Journal of Mathematical Neuroscience 1, 7, 2011.
27. E. A. Carlen, J. A. Carrillo, M. Loss, Hardy-Littlewood-Sobolev inequalities via fast diffusion flows, Proc. Nat. Acad. USA 107 (46), 19696-19701, 2010.
28. J. A. Carrillo, M. Fornasier, J. Rosado, G. Toscani, Asymptotic Flocking Dynamics for the kinetic Cucker-Smale model, SIAM J. Math. Anal. 42, 218-236, 2010.
29. J. A. Carrillo, M. DiFrancesco, A. Figalli, T. Laurent, D. Slepcev, Global-in-time weak measure solutions and finite-time aggregation for nonlocal interactions, Duke Math. J. 156, 229-271, 2011.
30. A. L. Bertozzi, J. A. Carrillo, T. Laurent, Blowup in multidimensional aggregation equations with mildly singular interaction kernels, Nonlinearity 22, 683-710, 2009.
31. A. Blanchet, J. A. Carrillo, P. Laurençot, Critical mass for a Patlak-Keller-Segel model with degenerate diffusion in higher dimensions, Calculus of Variations and PDEs 35, 133-168, 2009.
32. A. Blanchet, V. Calvez, J. A. Carrillo, Convergence of the mass-transport steepest descent scheme for the sub-critical Patlak-Keller-Segel model, SIAM J. Numer. Anal. 46, 691-721, 2008.
33. A. Blanchet, J. A. Carrillo, N. Masmoudi, Infinite Time Aggregation for the Critical PKS model in R2, Comm. Pure and Applied Mathematics 61, 1449-1481, 2008.
34. V. Calvez, J.A. Carrillo, Volume effects in the Keller-Segel model: energy estimates preventing blow-up, Journal Mathématiques Pures et Appliquées 86, 155-175, 2006.
35. J.A. Carrillo, R.J. McCann, C. Villani, Contractions in 2-Wasserstein length space and thermalization of granular media, Arch. for Rat. Mech. and Anal. 179, 217-263, 2006.
36. J. A. Carrillo, I. Gamba, A. Majorana, C. W. Shu, A WENO-solver for the transients of Boltzmann-Poisson for semiconductor devices. Performance and comparisons with Monte Carlo methods, Journal of Computational Physics 184, 498-525, 2003.
37. J.A. Carrillo, R.J. McCann, C. Villani, Kinetic equilibration rates for granular media and related equations, Revista Matemática Iberoamericana 19, 1-48, 2003.
38. J. A. Carrillo, G. Toscani, Intermediate asymptotics for strong solutions of the thin film equation, Comm. Math. Phys. 225, 551-571, 2002.
39. A. V. Bobylev, J. A. Carrillo, I. Gamba, On some properties of kinetic and hydrodynamic equations for inelastic interactions, J. Stat. Phys., 98, 743-773, 2000.
40. J. A. Carrillo, G. Toscani, Asymptotic L^1-decay of solutions of the porous medium equation to self-similarity, Indiana University Mathematics Journal, 49, 113-141, 2000.

Book Chapters (Selected)

1. V. Calvez, J. A. Carrillo, F. Hoffmann, the geometry of diffusing and self-attracting particles in a one-dimensional fair-competition regime, Lecture Notes in Mathematics 2186, CIME Foundation Subseries, Springer, 2018.
2. J. A. Carrillo, M. Fornasier, G. Toscani, F. Vecil, Particle, Kinetic, and Hydrodynamic Models of Swarming, Mathematical Modeling of Collective Behavior in Socio-Economic and Life Sciences, Series: Modelling and Simulation in Science and Technology, Birkhauser, (2010), 297-336.

INVITED LECTURES

Conference Talks (selected)

1. Invited Speaker at the 5th European Congress of Mathematicians, (Amsterdam 2008).
2. Invited Speaker at the 13th International Conference on Hyperbolic Problems: Theory, Numerics and Applications (HYP2010), (Beijing 2010).
3. Plenary Speaker at the Canadian Mathematical Society Summer Meeting, (Halifax 2013).
4. Invited Speaker at Modern Perspectives in Applied Mathematics: Theory and Numerics of PDEs, (Washington 2014).
5. Invited Speaker at the conference: XV International Conference on Hyperbolic Problems: Theory, Numerics and Applications, HYP2014, IMPA, (Rio de Janeiro 2014).
6. QJMAM Lecture at the joint BMC-BAMC (Glasgow 2021).
7. Invited Speaker at the 2nd joint SIAM-CAIMS Annual Meeting (Toronto 2020, Online Zoom Presentation).
8. Invited Speaker at the ENUMATH (Lisbon 2021).

PROFESSIONAL ACTIVITIES AND SERVICE

Serving Committees

- Head of the Division of the European Academy of Sciences, Section Mathematics, 2020-2022.
- Vice-president of the European Society of Mathematical and Theoretical Biology 2021-2023.
- Program Director of the SIAM activity group in Analysis of PDE 2019-2020.
- Applied Mathematics Committee, European Mathematical Society, 2010-2013. Chair 2014-2017.
- European Consortium for Mathematics in Industry Council, September 2005 - July 2012.
- Member of the ECMI Council, 2005 - October 2012.
- Chair of the organizing committee of the congress “Emerging Topics in Dynamical Systems and Partial Differential Equations,” SIAM/RSME-SCM-SEMA joint meeting, Barcelona, June 2010.

Editorial Boards - Selected

- Kinetic and Related Models, 2008-
- SIAM Journal on Mathematical Analysis (SIMA), 2010-
- Discrete and Continuous Dynamical Systems - Series A (DCDS-A), 2013-
- Journal and Bulletin of the London Mathematical Society, 2013-
- Multiscale Modeling and Simulation: A SIAM Interdisciplinary Journal, 2017-

Conferences/Thematic Programs Organized - Selected

- “Optimal Transport,” IPAM, UCLA, March-June 2008.
- “Mathematical Biology: Modelling and Differential Equations,” Centre de Recerca Matemàtica, Barcelona, January-June 2009.
- “Partial Differential Equations in Kinetic Theories”, Isaac Newton Institute for Mathematical Sciences, Cambridge (United Kingdom), August to December 2010.
- “Interactions between PDEs & Functional Inequalities”, Institut Mittag-Leffler, Fall 2016.
- “Year of Mathematical Biology”, 2018. It is joint venture of ESMTB and EMS.
- “Differential Equations arising from Organising Principles in Biology”, Oberwolfach, 23-29 September, 2018.
- “Frontiers in Kinetic Theory: Connecting Microscopic to Macroscopic Scales”, Isaac Newton Institute for Mathematical Sciences, Cambridge (United Kingdom), January to June 2022.

Panel Funding Agencies

- European Research Council, Committee Starting Grants in Mathematics, 2010-2011.
- European Research Council, Committee Consolidator Grants in Mathematics, Call 2012-2017.
- ICREA Research Professors 2017 and 2019.