Juan Antonio Acebrón Torres

Contacts

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Curriculum

Juan A. Acebrón received the Ph.D. degree in Mathematical Engineering from Universidad Carlos III de Madrid (Spain), in 2000. From 2000 to 2012, Acebrón was a visiting Researcher at the Rome Supercomputing Center (Rome, Italy); the Department of Physics, University of California, San Diego; the Department of Information Engineering, Universita di Padova (Padova, Italy); University of Alcala (Madrid, Spain), University Rovira-Virgili (Tarragona, Spain), and Instituto Superior Tecnico (Lisbon, Portugal). Acebrón is currently a Researcher at INESC-ID and an Assistant Professor at the Instituto Universitario de Lisboa ISCTE-IUL (Lisbon, Portugal), Information Science and Technology Department. His main research interests are in computational mathematics, mainly developing efficient and scalable algorithms for high performance supercomputing and random dynamical systems.

Research Interests

Applied and computational mathematics
Parallel Scientific Computing
Computational Physics
Nonlinear physics

Academic Qualifications

University/Institution	Type	Degree	Period
Universidad Carlos III de Madrid (Spain)	PhD	Engenharia Matemática	2000
Universidad Autonoma de Madrid (Spain)	Licenciate	Fisica Teórica	1994

Teaching Activities

Teaching Year	Sem.	Course Name	Degree(s)	Coord.
2024/2025	2º	Advanced Computing	Institutional Degree in Escola de Tecnologias e Arquitetura;	Yes
2024/2025	2º	Microprocessors	Bachelor Degree in Computer Engineering (PL); Bachelor Degree in Computer Engineering;	Yes
2022/2023	2º	Advanced Computing	Institutional Degree in Escola de Tecnologias e Arquitetura;	Yes
2022/2023	2º	Microprocessors		No
2022/2023	1º	Fundamentals of Computer Architecture	Bachelor Degree in Computer Engineering; Bachelor Degree in Computer Science and Business Management; Bachelor Degree in Telecommunications and Computer Engineering;	No
2021/2022	2º	Microprocessors	Bachelor Degree in Computer Engineering (PL); Bachelor Degree in Computer Engineering;	Yes
2021/2022	1º	Fundamentals of Computer Architecture	Bachelor Degree in Computer Engineering; Bachelor Degree in Computer Science and Business Management; Bachelor Degree in Telecommunications and Computer Engineering;	No
2020/2021	2º	Microprocessors	Bachelor Degree in Computer Engineering (PL); Bachelor Degree in Computer Engineering;	Yes
2019/2020	2º	Microprocessors	Bachelor Degree in Computer Engineering (PL); Bachelor Degree in Computer Engineering;	Yes

Supervisions

• Post-doc Supervisions

- Concluded

	Student Name	Title/Topic	Language	Institution	Concluding Year

1	Francisco Bernal Martinez	--	English	IST	2016

• Ph.D. Thesis

- Concluded

	Student Name	Title/Topic	Language	Institution	Concluding Year
1	Angel Rodriguez-Rozas	--	English	IST	2012

• M.Sc. Dissertations

- Concluded

	Student Name	Title/Topic	Language	Institution	Concluding Year
1	Filipe Magalhães	--	English	Instituto Superior Técnico	2018
2	Patrícia Isabel Duarte Santos	--	English	IST	2016
3	Carlos Xavier da Silva Martins	--	English	IST	2015
4	Sara Mancini	--	English	Universidade de Milão (Italia)	2013

Total Citations

Web of Science®	3773
Scopus	3609

Publications

• Scientific Journals

- Scientific journal paper

1	Magalhães, F., Monteiro, J., Acebron, J. A. & Herrero, J. R. (2022). A distributed Monte Carlo based linear algebra solver applied to the analysis of large complex networks. Future Generation Computer Systems. 127, 220-230 - Times Cited Web of Science®: 5 - Times Cited Scopus: 5 - Times Cited Google Scholar: 9

2	Acebron, J. A., Herrero, J. R. & Monteiro, J. (2020). A highly parallel algorithm for computing the action of a matrix exponential on a vector based on a multilevel Monte Carlo method. Computers and Mathematics with Applications. 79 (12), 3495-3515 - Times Cited Web of Science®: 7 - Times Cited Scopus: 7 - Times Cited Google Scholar: 10
3	Acebron, J. A. (2020). A probabilistic linear solver based on a multilevel Monte Carlo Method. Journal of Scientific Computing. 82 (3) - Times Cited Web of Science®: 2 - Times Cited Scopus: 3 - Times Cited Google Scholar: 3
4	Acebron, J. A. (2019). A Monte Carlo method for computing the action of a matrix exponential on a vector. Applied Mathematics and Computation. 362, 1-13 - Times Cited Web of Science®: 11 - Times Cited Scopus: 10 - Times Cited Google Scholar: 24
5	Bernal, F. & Acebron, J. A. (2016). A multigrid-like algorithm for probabilistic domain decomposition. Computers and Mathematics with Applications. 72 (7), 1790-1810 - Times Cited Web of Science®: 6 - Times Cited Scopus: 6 - Times Cited Google Scholar: 13
6	Bernal, F. & Acebrón, J. A. (2016). A comparison of higher-order weak numerical schemes for stopped stochastic differential equations. Communications in Computational Physics. 20 (3), 703-732 - Times Cited Web of Science®: 10 - Times Cited Scopus: 11 - Times Cited Google Scholar: 19
7	Mancini, S., Bernal, F. & Acebron, J. A. (2016). An efficient algorithm for accelerating Monte Carlo approximations of the solution to boundary value problems. Journal of Scientific Computing. 66 (2), 577-597 - Times Cited Web of Science®: 7 - Times Cited Scopus: 7 - Times Cited Google Scholar: 10
8	Acebron, J. A. & Ribeiro, M. A. (2016). A Monte Carlo method for solving the one-dimensional telegraph equations with boundary conditions. Journal of Computational Physics. 305, 29-43 - Times Cited Web of Science®: 16 - Times Cited Scopus: 18 - Times Cited Google Scholar: 24
9	Bernal, F., Acebron, J. A. & Anjam, I. (2014). A stochastic algorithm based on fast marching for automatic capacitance extraction in non-Manhattan geometries. SIAM Journal on Imaging Sciences. 7 (4), 2657-2674 - Times Cited Web of Science®: 8 - Times Cited Scopus: 9 - Times Cited Google Scholar: 17
10	Acebron, J. A. & Rodriguez-Rozas, A. (2013). Highly efficient numerical algorithm based on random trees for accelerating parallel Vlasov–Poisson simulations. Journal of Computational Physics. 250, 224-245 - Times Cited Web of Science®: 11 - Times Cited Scopus: 9 - Times Cited Google Scholar: 17

11	Acebron, J.A., Rappel, W.-J. & Bulsara, A. R. (2012). Probing a Noisy Oscillator System. Fluctuation and Noise Letters. 03 (03), L341-L348 - Times Cited Web of Science®: 2 - Times Cited Google Scholar: 2
12	Acebron, J. A. & Rodriguez-Rozas, A. (2011). A new parallel solver suited for arbitrary semilinear parabolic partial differential equations based on generalized random trees. Journal of Computational Physics. 230 (21), 7891-7909 - Times Cited Web of Science®: 11 - Times Cited Scopus: 10 - Times Cited Google Scholar: 17
13	Acebron, J. A., Rodriguez-Rozas, A. & Spigler, R. (2010). A fully scalable algorithm suited for petascale computing and beyond. Computer Science - Research and Development. 25 (1-2), 115-121 - Times Cited Scopus: 1 - Times Cited Google Scholar: 4
14	Acebron, J.A., Rodriguez-Rozas, A. & Spigler, R. (2010). Efficient parallel solution of nonlinear parabolic partial differential equations by a probabilistic domain decomposition. Journal of Scientific Computing. 43 (2), 135-157 - Times Cited Web of Science®: 15 - Times Cited Scopus: 14 - Times Cited Google Scholar: 26
15	Acebron, J. A., Rodriguez-Rozas, A. & Spigler, R. (2010). On the performance of a new parallel algorithm for large-scale simulations of nonlinear partial differential equations. Lecture Notes in Computer Science. 6067, 41-50
16	Duran Diaz, R., Rico, R., Garcia-Castillo, L. E., Gomez-Revuelto, I., Acebron, J. A. & Martinez-Fernandez, I. (2010). Parallelizing a hybrid finite element-boundary integral method for the analysis of scattering and radiation of electromagnetic waves. Finite Elements in Analysis and Design. 46 (8), 645-657 - Times Cited Web of Science®: 1 - Times Cited Scopus: 1 - Times Cited Google Scholar: 4
17	Acebron, J. A., Lozano, S. & Arenas, A. (2009). Enhancement of signal response in complex networks induced by topology and noise. Understanding Complex Systems. 2009, 201-209 - Times Cited Web of Science®: 2 - Times Cited Scopus: 1
18	Acebron, J. A., Rodriguez-Rozas, A. & Spigler, R. (2009). Domain decomposition solution of nonlinear two-dimensional parabolic problems by random trees. Journal of Computational Physics. 228 (15), 5574-5591 - Times Cited Web of Science®: 22 - Times Cited Scopus: 22 - Times Cited Google Scholar: 38
19	Acebron, J. A. & Spigler, R. (2007). A new probabilistic approach to the domain decomposition method. Lecture Notes in Computational Science and Engineering. 55, 473-480 - Times Cited Scopus: 4 - Times Cited Google Scholar: 11
20	Acebron, J. A. & Spigler, R. (2007). Supercomputing applications to the numerical modeling of industrial and applied mathematics problems. The Journal of Supercomputing. 40 (1), 67-80 - Times Cited Web of Science®: 7 - Times Cited Scopus: 6 - Times Cited Google Scholar: 13

21	Acebron, J. A., Lozano, S. & Arenas, A. (2007). Amplified signal response in scale-free networks by collaborative signaling. Physical Review Letters. 99 (12) - Times Cited Web of Science®: 81 - Times Cited Scopus: 78 - Times Cited Google Scholar: 89
22	Acebron, J. A., Busico, M. P., Lanucara, P. & Spigler, R. (2006). Domain decomposition solution of elliptic boundary-value problems via Monte Carlo and quasi-Monte Carlo methods. SIAM Journal on Scientific Computing. 27 (2), 440-457 - Times Cited Web of Science®: 35 - Times Cited Scopus: 37 - Times Cited Google Scholar: 60
23	Acebron, J. A. & Spigler, R. (2005). Second harmonics effects in random duffing oscillators. SIAM Journal on Applied Mathematics. 66 (1), 266-285 - Times Cited Web of Science®: 1 - Times Cited Scopus: 1 - Times Cited Google Scholar: 2
24	Acebron, J. A., Busico, M. P., Lanucara, P. & Spigler, R. (2005). Probabilistically induced domain decomposition methods for elliptic boundary-value problems. Journal of Computational Physics. 210 (2), 421-438 - Times Cited Web of Science®: 15 - Times Cited Scopus: 15 - Times Cited Google Scholar: 33
25	Acebron, J. A., Bonilla, L. L., Vicente, C. J. P., Ritort, F. & Spigler, R. (2005). The Kuramoto model: a simple paradigm for synchronization phenomena. Reviews of Modern Physics. 77 (1), 137-185 - Times Cited Web of Science®: 2976 - Times Cited Scopus: 2865 - Times Cited Google Scholar: 4366
26	Mazzetto, E., Someda, C. G., Acebron, J. A. & Spigler, R. (2005). The fractional Fourier transform in the analysis and synthesis of fiber Bragg gratings. Optical and Quantum Electronics. 37 (8), 755-787 - Times Cited Web of Science®: 12 - Times Cited Scopus: 10 - Times Cited Google Scholar: 10
27	Acebron, J. A. & Spigler, R. (2005). Fast simulations of stochastic dynamical systems. Journal of Computational Physics. 208 (1), 106-115 - Times Cited Web of Science®: 6 - Times Cited Scopus: 9 - Times Cited Google Scholar: 13
28	Acebron, J.A. (2004). Emergent oscillations in unidirectionally coupled overdamped bistable systems. Physical Review E. - Times Cited Web of Science®: 86 - Times Cited Scopus: 66 - Times Cited Google Scholar: 97
29	Acebron, J. A., Bulsara, A. R. & Rappel, W. J. (2004). Noisy FitzHugh-Nagumo model: from single elements to globally coupled networks. Physical Review E. 69 (2) - Times Cited Web of Science®: 69 - Times Cited Scopus: 69 - Times Cited Google Scholar: 95

30	Bulsara, A. R., Acebrón, J. A., Rappel, W.-J., Hibbs, A., Kunstmanas, L. & Krupka, M. (2003). Injection locking near a stochastic bifurcation: the dc SQUID as a case study. Physica A. 325 (1-2), 220-229 - Times Cited Web of Science®: 11 - Times Cited Scopus: 8 - Times Cited Google Scholar: 10
31	Acebron, J. A., Rappel, W.-J. & Bulsara, A. R. (2003). Cooperative dynamics in a class of coupled two-dimensional oscillators. Physical Review E. 67 (1), 162101-1621017 - Times Cited Web of Science®: 17 - Times Cited Scopus: 18 - Times Cited Google Scholar: 22
32	Acebron, J.A. (2001). Spectral analysis and computation for the Kuramoto-Sakaguchi integroparabolic equation. IMA Journal of Numerical Analysis. - Times Cited Web of Science®: 10 - Times Cited Scopus: 8 - Times Cited Google Scholar: 17
33	Acebron, J.A. (2001). Noise-mediated dynamics in a two-dimensional oscillator: Exact solutions and numerical results. EPL - Europhysics Letters. - Times Cited Web of Science®: 11 - Times Cited Scopus: 12 - Times Cited Google Scholar: 16
34	Acebron, J.A. (2001). Bifurcations and global stability of synchronized stationary states in the Kuramoto model for oscillator populations. Physical Review E. - Times Cited Web of Science®: 27 - Times Cited Scopus: 2 - Times Cited Google Scholar: 42
35	Acebron, J.A., Bonilla, L. L. & Spigler, R. (2000). Synchronization in populations of globally coupled oscillators with inertial effects. Physical Review E. 6 (3), 3437-3454 - Times Cited Web of Science®: 95 - Times Cited Scopus: 93 - Times Cited Google Scholar: 115
36	Acebron, J. A. & Spigler, R. (2000). Uncertainty in phase-frequency synchronization of large populations of globally coupled nonlinear oscillators. Physica D: Nonlinear Phenomena. 141 (1-2), 65-79 - Times Cited Web of Science®: 11 - Times Cited Scopus: 9 - Times Cited Google Scholar: 18
37	Acebron, J. A., Bonilla, L. L., De Leo, S. & Spigler, R. (1998). Breaking the symmetry in bimodal frequency distributions of globally coupled oscillators. Physical Review E. 57 (5), 5287-5290 - Times Cited Web of Science®: 36 - Times Cited Scopus: 36 - Times Cited Google Scholar: 54
38	Acebron, J.A. (1998). Adaptive frequency model for phase-frequency synchronization in large populations of globally coupled nonlinear oscillators. Physical Review Letters. - Times Cited Web of Science®: 98 - Times Cited Scopus: 96 - Times Cited Google Scholar: 146

39	Acebron, J.A. (1998). Asymptotic description of transients and synchronized states of globally coupled oscillators. Physica D: Nonlinear Phenomena. - Times Cited Web of Science®: 30 - Times Cited Scopus: 29 - Times Cited Google Scholar: 42

• Books and Book Chapters

- Book chapter

1	Rodriguez-Rozas, A., Acebron, J.A. & Spigler, R. (2021). The PDD method for solving linear, nonlinear, and fractional PDEs problems. In Luisa Beghin, Francesco Mainardi, Roberto Garrappa (Ed.), Nonlocal and fractional operators. (pp. 239-273).: Springer. - Times Cited Scopus: 1 - Times Cited Google Scholar: 1

• Conferences/Workshops and Talks

- Publication in conference proceedings

1	Acebron, J. A. & Spigler, R. (2008). Scalability and performance analysis of a probabilistic domain decomposition method. In Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics). (pp. 1257-1264). Gdansk: Springer. - Times Cited Google Scholar: 1
2	Acebron, J. A. & Spigler, R. (2007). A fully scalable parallel algorithm for solving elliptic partial differential equations. In Kermarrec, A. M.; Bouge, L.; Priol, T. (Ed.), Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics). (pp. 727-736). Rennes: Springer Verlag. - Times Cited Web of Science®: 3 - Times Cited Scopus: 2 - Times Cited Google Scholar: 8
3	Acebron, J.A., Duran, Raul, Rico, Rafael & Spigler, R. (2007). A new domain decomposition approach suited for grid computing. In Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics). - Times Cited Scopus: 1 - Times Cited Google Scholar: 1
4	Acebron, J.A. (2002). Noise-mediated cooperative behavior in a system of coupled DC squids. In Proceedings - IEEE International Symposium on Circuits and Systems. (pp. 293-296).: IEEE. - Times Cited Google Scholar: 1

- Talk

1	Acebron, J.A. (2021). A multilevel Monte Carlo method for computing the action of a matrix exponential on a vector. International Conference on Monte Carlo Methods and Applications(MCM).
2	Acebron, J.A. (2019). A highly parallel algorithm for computing the action of a matrix exponential on a vector based on a multilevel Monte Carlo method. ICIAM 2019.
3	Tiago F. Antunes, Ribeiro, M. & Acebron, J.A. (2015). Uniform Spectral Partition Method for the Propagation of Gaussian Pulses on Lossy Transmission Lines using the Monte Carlo Method. 2015 Loughborough Antennas & Propagation Conference (LAPC).

4	F. Bernal, Acebron, J.A. & S. Mancini (2015). Accelerated Monte Carlo schemes for bounded SDEs. 10th IMACS on Monte Carlo Methods.
5	Acebron, J.A. & Ribeiro, M. (2014). Efficient parallel solution of the telegraph equations subject to general boundary conditions by a novel Monte Carlo method. Workshop on Numerical Methods on High-Performance Computers International.