

Eric Séré

French.

Born in Paris, 15 July 1965.

Married, three children.

Present position :

Full Professor at Université Paris-Dauphine since September 1998.

Career :

1995-98: Professor at Université de Cergy-Pontoise.

1994-95: Visiting Member at Courant Institute (New York University).

1991-94: "Ingénieur du Corps des Mines", researcher at CEREMADE; scientific advisor at Ecole des Mines de Paris.

Études :

"Habilitation à diriger des recherches", 1994, Paris-Dauphine.

"Doctorat en Sciences", 1993, Paris-Dauphine (directeur: Ivar Ekeland).

"Ingénieur au Corps des Mines", diploma obtained in October 1991.

"Ingénieur de l'Ecole Polytechnique", diploma obtained in July 1988.

"Bronze Medal", International Mathematical Olympiads, 1984.

Domain of research :

Variational methods and their applications in mathematical physics and quantum chemistry.

Awards :

Cours Peccot at Collège de France in 1995.

Member of Institut universitaire de France from 1999 to 2004.

Editorial activities :

Co-éditeur in chief (with M.J. Esteban) of Annales de l'IHP - Analyse non linéaire since 2006.

Administrative activities and other responsibilities:

- Director of CEREMADE (UMR 7534) from January 2005 to September 2010.
- Member of the scientific council of Université Paris-Dauphine since 2012 (and earlier, in 2000-2004). During the last ten years, member of several hiring committees at Paris-Dauphine, Cergy-Pontoise, Paris 6 and 7.
- Organization of the research Master "EDPA" at Paris-Dauphine from 2000 to 2004.
- President of the hiring committee of mathematics at Université de Cergy-Pontoise in 1997 and 1998.

Recent teaching activities:

- Analysis (Bachelor 1), Statistics (Bachelor 2), Functional Analysis (Master 1), Introduction to PDEs (Master 2) at Université Paris-Dauphine.
- Professeur chargé de cours at Ecole Polytechnique (Department of Mathématiques) from 1997 to 2009.
- Functional analysis and PDEs, Magistère MMFAI (ENS Ulm) from 2002 to 2005.

PhDstudents :

9 PhD theses defended. Present positions of former students:

- Patrick Bernard (soutenance en 2000), Full Professor at ENS Ulm.
- Eric Paturel (defence in 2000), Assistant Professor at Université de Nantes.
- Mathieu Lewin (defence in 2004), Director of Research at CNRS.
- Nabile Boussaid (defence in 2006), Assistant Professor at Université de Franche-Comté.
- Simona Rota Nodari (defence in 2011), Assistant Professor at Université de Bourgogne.
- Mauricio Garcia Arroyo (defence in 2011), Consultant in innovation financing.
- Antoine Levitt (defence in 2013), Researcher at INRIA.
- Loïc Le Treust (defence in 2013), post-doc at université de Rennes I.

-Jérémy Sok (defence in 2014), post-doc at université de Copenhague.

Participation in scientific projects:

- Projet ANR NoNap "NONlinear problems in Nuclear and Atomic Physics" (2010-2014).

- Projet ANR Accquarel "Approches computationnelles en chimie quantique relativiste" (2006-2009).

- European network "Analysis of large quantum systems" (2002-2006).

- French organizer of a franco-chilian cooperation project ECOS "EDPs de la Physique Mathématique" (2002-2006).

Organisation of conferences :

- Co-organiser (with V. Kutzelnigg, M. Lewin, M. Esteban) of a workshop and a conference during the trimester "Variational and Spectral Methods in Quantum Mechanics" (15 April-12 July 2013 at IHP).

- Co-organiser (with M. Lewin) of the international conference "Mathematical Aspects of Quantum Electrodynamics" (21-25 June 2010 at IHP).

- Co-organiser (with C. Viterbo) of the Colloquium in honor of Ivar Ekeland (6-8 June 2004 at Université Paris-Dauphine).

Participation in international meetings with communication :

1992: "Variational Methods in Nonlinear Analysis" (Erice, Sicily); "Conference on Nonlinear Hamiltonian Mechanics" (Trente, Italy); "First World Congress of Nonlinear Analysts" (Tampa, Florida); "Deuxième Rencontre Franco-Taiwanaise d'EDP Non Linéaires et Applications" (ENS, Paris).

1993: "Colloque Paris-Pise-Rome sur les EDP" (ENS); "International Joint Mathematics Meetings, AMS-CMS-MAA" (Vancouver).

1994: "International Meeting on Local and Global Methods in Hamiltonian Systems" (Trieste, Italy).

1995: "International Meeting on PDEs and Variational Inequalities" (Ischia, Italy); "Meeting on dynamical systems", (Oberwolfach, Germany).

1996: "International meeting on variational inequalities and PDEs" (Kyoto, Japon); "International conference on nonlinear PDEs and applications" (Bangalore, Inde); "Meeting on nonlinear eigenvalue problems" (Oberwolfach, Germany); "EC meeting on nonlinear PDEs" (IHP, Paris).

1997: "Workshop on multibump solutions" (Leyde, Netherlands).
 1998: "Meeting on variational methods" (Oberwolfach, Germany); "Conference in honour of Louis Nirenberg" (Trieste, Italy); "Third European meeting on PDEs and quantum mechanics" (Regensburg, Germany).
 1999: "Quantum transport models" (ESI Vienne); "Topological and variational methods in nonlinear analysis" (Cuernavaca); "Hamiltonian mechanics" (ICMS Edimburgh); "Large coulomb systems" (Oberwolfach).
 2000: "Meeting on kinetic models" (Luminy); "International meeting in memory of J. Moser" (Rome).
 2001: "Hamiltonian mechanics" (ICMS Edimbourg); "PIMS Thematic Programme on Nonlinear PDEs" (Vancouver); "Q-Math 8" (Taxco, Mexico).
 2002: "Calculus of Variations" (Oberwolfach, Allemagne); "Calculus of Variations in Nonlinear Phenomena" (Martina Franca, Italy).
 2003: "EPSRC Spectral theory meeting" (Cardiff, Grande-Bretagne).
 2004: "New developments on variational methods and their applications" (Banff, Canada); "Conference on Hamiltonian Systems and Celestial Mechanics" (Nankai, China); "Workshop on Mathematical Ideas in Nonlinear Optics" (ICMS Edimburgh); "PDE session, conférence franco-canadienne de Toulouse"; "Bifurcation Theory and Nonlinear Waves" (EPFL); "Mathematical Challenges in Quantum Chemistry" (Warwick, GB).
 2005: "Symposium on Variational Methods and Nonlinear Differential Equations" (Rome); Special Session "Mathematical Physics" at the Joint AMS-DMV Meeting (Mainz); "Analysis and Quantum Theory" (Oberwolfach).
 2006: "Current trends in Nonlinear Analysis" (Otranto); "Hamiltonian dynamics and symplectic geometry" (Kyoto); "International conference on Calculus of Variations, PDEs and Nonlinear Analysis" (Beijing); "Mathematical and Numerical Aspects of Quantum Chemistry Problems" (Oberwolfach).
 2007: "Mathematical Models of Complex Quantum Systems" (Berlin); "International Conference on Variational Methods" (Nankai University, Tianjin).
 2008: Conférence plénière au second congrès Canada-France des sciences mathématiques; "Conference France-Taiwan" (CIRM); "Sino-French workshop on PDEs and Applications" (Nankai University); AMS-SMS meeting, special session on "Elliptic and parabolic nonlinear PDEs" (Shanghai).
 2009: "Mathematical Aspects of Quantum Field Theory" (Bordeaux); "International Conference on Variational Methods 2" (Nankai University).

2010: "Calculus of Variations and Related Topics" (Taiwan); "International Conference on Relativistic Effects in Heavy Elements" (Pekin).

2011: "Recent advances in Elliptic Issues" (Besançon); "8th East China PDE conference" (Xian); "Mathematical Methods for Ab Initio Quantum Chemistry" (Nice).

2012: "International Conference on Variational Methods 3" (Nankai University, Tianjin); "Workshop on Mathematical and Numerical Analysis of Electronic Structure Models" (Pekin); "Variational Methods in Mathematical Physics" (Karlsruhe, Allemagne); "New Developments in Relativistic Quantum Mechanics and Applications" (Newton Institute, Cambridge); "Singular limit problems in nonlinear PDEs" (CIRM).

2013: "International Workshop on Variational Problems and PDEs" (Sao Paulo); "Dispersive PDEs: Models and Dynamics" (Pisa).

2014: Variational methods for Nonlinear elliptic PDEs (KAIST, Corée); "NCTS Workshop on Calculus of Variations and Related Topics" (Taiwan); "Analysis of Relativistic and Nonrelativistic Models in Quantum Mechanics" (Roma Sapienza).

Séminaires :

1990 : University of Bochum.

1991 : ETH (Zürich), University of Bochum, ENS Cachan.

1992 : Scuola Normale Superiore (Pisa), ETH (Zürich), University of Orsay, Collège de France, University of Bochum.

1993 : ETH (Zürich), University of British Columbia (Vancouver).

1994 : Scuola Normale Superiore, ENS Cachan, Université Paris 6, Université de Tunis, ICTP Trieste, Courant Institute.

1995 : Universities of Rutgers and Wisconsin-Madison, SISSA (Trieste).

1996: Université Paul Sabatier (Toulouse), ENS, University Waseda (Tokyo), University of Osaka, Courant Institute, Universities of Rutgers and Princeton.

1997 : Universities of Bath and Leyden, Ecole Polytechnique.

1998 : Ecole des Ponts, Universities Roma 2 and of British Columbia.

1999 : ENS, Université de Versailles, EPFL.

2001 : Universités Paris 6 et de Warwick.

2002 : Universités Toulouse 3, de Grenoble, de Milan.

2003 : Collège de France, Université de Lille.

2004 : Universities of Munich, Copenhagen, Paris 7, Paris 5, Aix-Marseille 3.
2005 : Universities of Cergy-Pontoise and Nantes.
2006 : Collège de France.
2007 : INSA Toulouse, EPFL, Vrije Universiteit Amsterdam.
2008 : Université de Besançon.
2009: University of Cardiff, University of Bath, Université de Lille.
2011: Université d'Avignon, Shanghai Normal University.
2013: IHP, IHES.
2014: Université de Lille 1, Université de Besançon, EPFL.
2015: Université Paris 13.

Invited stays at foreign universities:

Mai 1990 : University of Bochum (1 week).
Mai 1991 : ETH (1 week).
Juillet-août 1991 : University of Yale (1 month).
Décembre 1991 : University of Bochum (1 week).
Mars 1992 : Scuola Normale Superiore (1 week).
Mai 1992: ETH (1 semaine).
Juin et décembre 1992: University of Bochum (2 weeks).
Mai 1993: ETH (1 semaine).
Août 1993: University of British Columbia (1 month).
Septembre 1994-juin 1995: Courant Institute.
Mars 1995: University of Wisconsin-Madison (1 week).
Avril 1995: University of Rutgers (1 week).
Mai 1995: Collège de France (1 month, Cours Peccot).
Octobre 1995: SISSA Trieste (1 week).
Mars 1996: Scuola Normale Superiore (1 week).
Juin 1996: University Waseda of Tokyo (2 weeks).
Octobre 1996: Courant Institute (1 month).
Novembre 1996: University of Leyden (1 week).
Mars 1997: University of Bath (1 week).
Juin 1997: I.S.I. Turin (2 weeks).
Mai 1998: University Roma 2 (2 weeks).
Juillet 1998: University of British Columbia (1 month).
Avril 1999: University of Cardiff (2 weeks).
Août 2001: University of British Columbia (1 month).

Septembre 2002: University of Milano (1 week).
Mars 2004: University of Munich (1 week).
Novembre 2004: University of Copenhagen (1 week).
Février 2005: Scuola Normale Superiore (2 weeks).
Septembre 2005: University of Torino (2 weeks).
Juillet 2006: ESI Vienne (2 weeks).
Avril 2007: Vrije Universiteit Amsterdam (1 week).
Juillet 2008: University of British Columbia (1 month).
Mai 2010: NCTS (Taiwan, 1 week).
Juillet 2011: Shanghai Normal University (2 weeks).
Juillet 2012: Newton Institute, Cambridge (3 weeks).
Juillet 2013: University of British Columbia (1 week).

Publications and preprints :

1. V. Coti-Zelati, I. Ekeland, É. Séré, Solutions doublement asymptotiques de systèmes hamiltoniens convexes, *C.R.A.S. 310, Série I (1990)*, 631-633.
2. V. Coti-Zelati, I. Ekeland, É. Séré, A variational approach to homoclinic orbits in Hamiltonian systems, *Math. Annalen 288 (1990)*, 133-160.
3. É. Séré, Existence of infinitely many homoclinic orbits in Hamiltonian systems, *Math. Zeitschrift 209 (1992)*, 27-42.
4. É. Séré, Looking for the Bernoulli Shift, *Annales de l'I.H.P., Analyse non linéaire 10, n° 5 (1993)*, 561-590.
5. É. Séré, Bases orthonormées de paquets d'ondelettes, *Rev. Mat. Iberoam. 10, N° 2 (1994)*, 349-362.
6. X. Fang, É. Séré, Adapted multiple folding local trigonometric transforms and wavelet packets, *Appl. Comput. Harmon. Anal. 1, N° 2 (1994)*, 169-179.
7. É. Séré, Multibump solutions and topological entropy. Ambrosetti, Antonio (ed.) et al., Variational methods in nonlinear analysis (proceedings). Gordon and Breach Publishers. 161-171 (1995).
8. É. Séré, Hamiltonian systems and nonlinear Dirac equations. Ambrosetti, A. (ed.) et al., Variational and local methods in the study of Hamiltonian systems (proceedings). World Scientific. 118-128 (1995).
9. É. Séré, Localisation fréquentielle des paquets d'ondelettes, *Rev. Mat. Iberoam. 11, N° 2 (1995)*, 334-354.
10. É. Séré, Homoclinic orbits on compact hypersurfaces in \mathbb{R}^{2N} , of restricted contact type, *Comm. Math. Phys. 172 (1995)*, 293-316.
11. K. Cieliebak, É. Séré, Pseudo-holomorphic curves and multiplicity of homoclinic orbits, *Duke Math. J. 77, n° 2 (1995)*, 483-518.
12. M.J. Esteban, É. Séré, Stationary states of the nonlinear Dirac equation: a variational approach, *Comm. Math. Phys. 171 (1995)*, 323-350.
13. K. Cieliebak, É. Séré, Pseudo-holomorphic curves and multibump homoclinic orbits. RIMS Kokyuroku 973, 12-23 (1996).

14. A. Cohen, É. Séré, Time-frequency localization by non-stationary wavelet packets, dans : "Subband and Wavelet Transforms - Theory and Design", ed. M. T. Smith and A. Akansu, Kluwer Academic Publisher (1996).
15. M.J. Esteban, É. Séré, Existence de solutions stationnaires pour l'équation de Dirac non-linéaire et le système de Dirac-Poisson, *C.R.A.S. 319, Série I*, 1213-1218.
16. M.J. Esteban, V. Georgiev, É. Séré, Stationary solutions of the Maxwell-Dirac and the Klein Gordon-Dirac equations, *Calc. Var. 4 (1996)*, 265-281.
17. M.J. Esteban, V. Georgiev, É. Séré, Bound-state solutions of the Maxwell-Dirac and the Klein-Gordon-Dirac systems, *Lett. Math. Phys. 38, No.2 (1996)*, 217-220.
18. B. Buffoni, É. Séré, A global condition for quasi-random behavior in a class of conservative systems, *Comm. Pure Appl. Math. Vol. XLIX (1996)*, 285-305.
19. F. Dibos, É. Séré, An approximation result for the minimizers of the Mumford-Shah functional, *Boll. UMI 7, 11-A (1997)*, 149-162.
20. M.J. Esteban, É. Séré, Existence and multiplicity of solutions for linear and nonlinear Dirac problems, *Partial Differential Equations and Their Applications*, CRM Proceedings and Lecture Notes, volume 12 (1997).
21. M.J. Esteban, É. Séré, Les équations de Dirac-Fock, Sémin. EDP, Éc. Polytech., Cent. Math., Palaiseau (1998).
22. K. Cieliebak, É. Séré, Pseudo-holomorphic curves and the Shadowing Lemma, *Duke Math. J. 99, No. 1 (1999)*, 41-73.
23. M.J. Esteban, É. Séré, Solutions of the Dirac-Fock equations for atoms and molecules, *Comm. Math. Phys. 203 (1999)*, 499-530.
24. J. Dolbeault, M.J. Esteban, É. Séré, Variational characterization for eigenvalues of Dirac operators, *Calc. Var. 10 (2000)*, 321-347.
25. J. Dolbeault, M.J. Esteban, É. Séré, On the eigenvalues of operators with gaps, application to Dirac operators, *Journ. Funct. Anal. 174 (2000)*, 208-226.
26. J. Dolbeault, M.J. Esteban, É. Séré, M. Vanbreugel, Minimization methods for the one-particle Dirac equation, *Phys. Rev. Let. 85, No. 19 (2000)*, 4020-4023.

27. J. Dolbeault, M.J. Esteban, É. Séré, Variational methods in relativistic quantum mechanics: new approach to the computation of Dirac eigenvalues, *Mathematical models and methods for ab initio quantum chemistry*, 211–226, Lecture Notes in Chem., 74, Springer, Berlin, 2000.
28. M.J. Esteban, É. Séré, Nonrelativistic limit of the Dirac-Fock equations, *Ann. H. Poincaré* 2 (2001), 941–961.
29. M.J. Esteban, É. Séré, An overview on linear and nonlinear Dirac equations. *Discrete Contin. Dyn. Syst.* 8, No.2, 381–397 (2002).
30. M.J. Esteban, É. Séré, On some linear and nonlinear eigenvalue problems in relativistic quantum chemistry. *Benci, V. (ed.) et al., Variational and topological methods in the study of nonlinear phenomena (proceedings)*. Birkhauser. *Prog. Nonlinear Differ. Equ. Appl.* 49, 15–27 (2002).
31. M.J. Esteban, É. Séré, A max-min principle for the Dirac-Fock functional, *Contemp. Math.* 307 (2002), 135–141.
32. B. Buffoni, É. Séré, J.F. Toland, Surface water waves as saddle points of the energy, *Calc. Var.* 17 (2003), no. 2, 199–220.
33. J.P. Desclaux, J. Dolbeault, M.J. Esteban, P. Indelicato, É. Séré, Computational approaches of relativistic models in quantum chemistry, *Handbook of numerical analysis, Vol. X*, 453–483, North-Holland, Amsterdam, 2003.
34. J. Dolbeault, M.J. Esteban, É. Séré, A variational method for relativistic computations in atomic and molecular physics, *Int. J. Quantum Chemistry* 93 (2003), 149–155.
35. M.J. Esteban, É. Séré, Dirac-Fock models for atoms and molecules and related topics, *XIVth International Congress on Mathematical Physics*, 21–28, World Sci. Publ., Hackensack, NJ, 2005.
36. B. Buffoni, É. Séré, J.F. Toland, minimisation methods for quasi-linear problems, with an application to periodic water waves, *SIAM J. Math. Anal.* 36 (2005), no. 4, 1080–1094.
37. J.M. Barbaroux, M.J. Esteban, É. Séré, Some connexions between Dirac-Fock and electron-positron Hartree-Fock, *Ann. Henri Poincaré* 6 (2005), no. 1, 85–102.

38. C. Hainzl, M. Lewin, É. Séré, Existence of a stable vacuum in the Bogoliubov-Dirac-Fock approximation, *Comm. Math. Phys.* 257 (2005), no. 3, 515–562.
39. C. Hainzl, M. Lewin, É. Séré, Self-consistent solution for the polarized vacuum in a no-photon QED model, *J. Phys. A* 38 (2005), no. 20, 4483–4499.
40. J. Dolbeault, M.J. Esteban, É. Séré, General results on the eigenvalues of operators with gaps arising from both ends of the gaps, *Journal of the E.M.S.* 8 (2006), no. 2, 243–251.
41. C. Carminati, É. Séré, K. Tanaka, The fixed energy problem for a class of nonconvex singular Hamiltonian systems, *Journ. Diff. Eq.* 230 (2006), no. 1, 362–377.
42. B. Buffoni, M.J. Esteban, É. Séré, Normalized Solutions to Strongly Indefinite Semilinear Equations, *Advanced Nonlinear Studies* 6 (2006), no. 2, 333–357.
43. C. Hainzl, M. Lewin, É. Séré, J.P. Solovej, A minimization method for relativistic electrons in a mean-field approximation of quantum electrodynamics, *Phys. Rev. A* 76 (2007), 052104.
44. M.J. Esteban, M. Lewin, É. Séré, Variational methods in relativistic quantum mechanics, *review*, *Bull. Amer. Math. Soc. (N.S.)* 45 (2008), no. 4, 535–593.
45. C. Hainzl, M. Lewin, É. Séré, Existence of atoms and molecules in the mean-field approximation of no-photon Quantum Electrodynamics, *Arch. Rational Mech. Anal.* 192 (2009), no. 3, 453–499.
46. P. Gravejat, M. Lewin, É. Séré, Ground state and charge renormalization in a nonlinear model of relativistic atoms, *Comm. Math. Phys.* 286 (2009), no. 1, 179–215.
47. M. Lewin, É. Séré, Spectral pollution and how to avoid it, *Proc. London Math. Soc.* 100 (2010), no. 3, 864–900.
48. P. Gravejat, M. Lewin, É. Séré, Renormalization and asymptotic expansion of Dirac’s polarized vacuum, *Comm. Math. Phys.* 306 (2011), no. 1, 1–33.

49. P. Gravejat, C. Hainzl, M. Lewin, É. Séré, Two Hartree-Fock models for the vacuum polarization, *Proceeding of the Journées E.D.P., Biarritz (France), June 4-8, 2012*.
50. P. Gravejat, C. Hainzl, M. Lewin, É. Séré, Construction of the Pauli-Villars-regulated Dirac vacuum in electromagnetic fields, *Arch. Rat. Mech. Anal.*, 208 (2013), no 2, 603-665.
51. M. Lewin, É. Séré, Spurious Modes in Dirac Calculations and How to Avoid Them, *Many-Electron Approaches in Physics, Chemistry and Mathematics*, 31-52, *Mathematical Physics Studies*, Springer (2014).
52. É. Séré, Relativistic Theories for Molecular Models, *Encyclopedia of Applied and Computational Mathematics*, 1247-1251 (2015).
53. M. Garcia Arroyo, É. Séré, Existence of kink solutions in a discrete model of the polyacetylene molecule, *preprint hal-00769075*.
54. P. Graewe, U. Horst and É. Séré, Smooth solutions to portfolio liquidation problems under price-sensitive market impact, *preprint arXiv:1309.0474*
55. I. Ekeland, É. Séré, An implicit function theorem for non-smooth maps between Fréchet spaces, *preprint arXiv:1502.01561*