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## CURRICULUM VITÆ

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### Jérôme Bolte

Born in Perpignan (France), February 5th 1971.  
Married; a child.

#### Current position

Full Professor, University Toulouse Capitole

#### Address, phone, email

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31015 Toulouse

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### Academic positions

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**2004-2010** Maître de Conférences at University Paris 6.

2007-2008 Researcher at INRIA / CMAP, École Polytechnique (Palaiseau).

**2010-today** Professor at University Toulouse Capitole / TSE.

### Education

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**1996-1997** Agrégation de Mathématiques

**1999-2000** Master in Applied Mathematics, U. Montpellier II

**2000-03** PhD in Applied Mathematics, U. Montpellier II

Advisor: Hedy Attouch (U. Montpellier 2).

Dissertation title : “*Sur des systèmes dynamiques dissipatifs de type gradient / On dissipative dynamical systems of gradient type*”

Committee: H. Attouch, A. Auslender, F. Clarke, J.-N. Corvellec, B. Lemaire, A. Seeger

Referees: A. Auslender, F. Clarke, A. Haraux

**2003-2004** Post-doctoral fellow at Simon Fraser University (Vancouver, 3 months) and Santiago de Chile (grant ECOS, Paris V), Universidad de Chile.

**2008-2009** Habilitation à diriger des recherches defended in November 2008, at U. Paris 6, “*Sur quelques principes de convergence en Optimisation / Some convergence principles in optimization*”.

Committee: H. Attouch, F. Bonnans, A. Ioffe, K. Kurdyka, M. Quincampoix, S. Sorin

Referees : R. Cominetti, A. Ioffe, K. Kurdyka

## Research grants

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Grants “Air Force” (2018-2020) Towards a theory of long-step algorithms for large scale Optimization

Grant ANR, (2017-2021) “Optimisation on measure spaces”

Grants “Air Force” (2014-2018) “Forward-backward splitting for nonconvex optimization problems” and “Majorization-minimization processes for optimization”

Grant ANR (2014-2018) “Aspects géométriques de la théorie des jeux” / “Geometric Aspects of Game Theory”

Grant PEPS Humains (2014), EMC<sup>2</sup>, “Étude Morphométrique de la Céramique celtique”

Grant PGMO “Programme Gaspard Monge pour l’Optimisation” (2012-2014, Fondation Hadamard), “Semi-algebraic approaches to doubly sparse problems.”

Grant MEC (2012-2015, Spain), “Variational optimization: structure and duality and variational analysis: fundamentals and applications”, in collaboration with A. Daniilidis and J. Martinez-Legas (Universitat autonoma Barcelona).

Grant ANR (2009-2013), “Optimization, Strategy, Selection : Dynamics, Approximations, and Applications”.

Grant MEC (2009-2011, Spain), “Advances in convex optimization and variational analysis: fundamentals and applications”, in collaboration with A. Daniilidis and J. Martinez-Legas (Universitat autonoma Barcelona).

Grant CNRS/PEPS (2009-2010, Exploratory project, Math & ST2I), “Nonconvex optimization methods for semi-algebraic problems in signal processing”, in collaboration with P.L. Combettes et J.-C. Pesquet.

Grant ANR blanc (2005-2008), “Optimization, game and dynamical systems in decision science: costs-to-move, models and algorithms”.

## Distinctions

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ERC interview, October, 2015 (Mathematics)

PES/PEDR since 2005

SIAM Optimization prize, SIAG 2017 with S. Sabach and M. Teboulle for the article *Proximal alternating linearized method for nonconvex and nonsmooth problems*, in Math. Programming, 2014

## Research Visits

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**2002 & 2003** Universidad de Chile, Santiago, Chile, (Alvarez)

**2003** Simon Fraser University, C.E.C.M., Vancouver, Canada (Lewis)

**2004-2011** Universitat Autònoma de Barcelona, Barcelona, Spain (Daniilidis)

**2006** Nagoya University, Japan (Shiota)

- 2007 & 2008** Tel Aviv University, Israel (Teboulle)
- 2012** EPFL, Switzerland (Cehver)
- 2013** Göttingen University, Germany, (Luke)
- 2014** Vérone University, Italy  
Rome, NY, USA (Suter)
- 2015** Chambéry University, France (Kurdyka)  
Rome, NY, USA (Suter)
- 2016** CIRM, Marseille, Research in pair,  
Yamaguchi University, Institute of Time Studies, Japan  
Sevilla University, Spain
- 2018** Tel Aviv University, Israel

## Organization of conferences & Academic activities ---

### Organization of seminars

- Co-organizer of the decision mathematics seminar in Toulouse (2011-2012 / 2013-2014)
- Co-founder and co-organizer of the Optimization seminar of Toulouse (2012- )  
<http://projects.laas.fr/spot/>

### Organization of conferences

ANR workshop, Optimization-Games-Economics, Montpellier 2006.  
<http://www.ecp6.jussieu.fr/ANR06/>

CODE 2007.  
<http://www.ann.jussieu.fr/plc/code2007/index.html>

ANR workshop, Dynamics and Optimization, Paris 6.  
<http://www.ecp6.jussieu.fr/dynamiques-et-optimisations/index.html>

“Conference on Variational Analysis and Optimization”, Montpellier, September 2009.  
<http://anavar09.math.univ-montp2.fr/>

“Games and Strategy in Paris”, Paris (IHP), June 11-13th 2012.  
<https://sites.google.com/site/sorin60th/>

Cluster chair of the cluster “Nonsmooth Optimization” at the “International Symposium of Mathematical Programming (ISMP 2012)”, Berlin, August 19–23th 2012.  
<http://ismp2012.mathopt.org/>

Franco-Chilean days, July 5th-7th, Toulouse, 2017  
<https://www.irit.fr/JFCO/>

### Students & Thesis

Post-doctoral fellow, Antoine Hochart 2016-2017

Post-doctoral fellow, Zheng Chen 2016-2017

PhD Advisor with C. Fevotte, E. Pauwels of Camille Castera, 2018-2021

PhD Advisor with A. d'Aspremont of Radu Dragomir, 2018-2021

PhD Advisor of Walter Ngambou, 2015-2018

PhD Advisor of Phong Trong Nguyen, 2013-2017

Advisor of master internships, "Optimisation et regroupement de données" Brahim Amhirri, 2007; "Asymmetric high bid auctions", L. Simantudjak, 2013, A. Idimova "A tutorial for multistage stochastic problems"

Reviewer of the PhD thesis, "Quelques contributions à des systèmes dynamiques et algorithmes issus de la mécanique non régulière et de l'optimisation", B. Baji, U. Montpellier 2, February 6, 2009.

Reviewer of the HDR, "Algorithmes en optimisation et analyse variationnelle dans les espaces de Hilbert", Juan Peypouquet, U. Paris 6, June 5th, 2014

Reviewer of the PhD thesis, "Nonconvex s-lower regular functions", Kecis Ilyas, U. Montpellier 2, June, 2014.

Member of the thesis committee of H.Y. Le, "A variational look at the rank function", U. Toulouse 3, May 22th, 2013.

Member of the thesis committee of V. Leclère, "Contributions to Decomposition Methods in Stochastic Optimization", École des Ponts et Chaussées et Université Paris-Est, June 25th, 2014

President of the thesis committee of P. Benchimol, "Tropical aspects of linear programming", École Polytechnique, Palaiseau, December 2th, 2014

Reviewer of the PhD thesis, "Algorithmes d'optimisation en grande dimension : applications à la résolution de problèmes inverses", Audrey Repetti, U. Paris Est, June, 2015.

Member of the Thesis committee of B. Ziliotto "Stratégies et paiements de long terme dans les jeux répétés à deux joueurs", September 18th, 2015

Reviewer of the PhD thesis, "Decomposition Strategies for Nonconvex Problems, a Parametric Approach", EPFL, Jean-Hubert Hours, 2015.

Member of the HDR committee, "Variational-analysis look at combinatorial optimization and other selected topics in optimization", Université Grenoble Alpes, Jérôme Malick, 2017.

Reviewer of the PhD thesis committee, "Approximation stochastique et régression par moindres carrés : applications en apprentissage automatique", ENS Paris, Nicolas Flammarion, 2017.

Member of the PhD thesis committee, "Some approximation schemes in polynomial optimization", LAAS, Toulouse, Roxanna Hess, 2017.

Member of the PhD thesis committee, "On the geometry of optimization problems and their structure", ENS Paris, Vincent Roulet, 2017.

Reviewer of the PhD thesis committee, "Learning without smoothness and strong convexity", EPFL, Lausanne, Switzerland, Yen-Huan Li, 2018.

## Administrative duties

Head of the Mathematics group at TSE (MADS group), 2015-2017.

Member of the recruitment committee of Paris 6 (MCF 2005-2009 & PR 2015-16/2016-17), Toulouse I Capitole (MCF 2013-2014), Telecom ParisTech (MCF 2014-2015), TSE (2017-).

Treasurer of MODE-SMAI group (2008-2009), and member of MODE-SMAI council 2005-2009.

## Editorial and other Scientific Activities

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Associate editor of “Journal of Optimization Theory and Applications”, 2014-

Associate editor of “Mathematics of Operations Research”, 2013-

Associate editor of “Mathematical Programming Series A ”, 2018-

Former associate editor of “Asia-Pacific Journal of Operational Research”, APJOR 2012-2013

Member of the Fermat’s prize committee, 2017

Expert for ANR, ASF, DFG, ISF, FONDECYT, GIF, RCG, SNSF...

Expert for SIAM journals, MPA, MOR, FOCM, PAMS, JDE, TAMS, JFA, Duke...

Cluster chair of the cluster “Nonsmooth Optimization” at ISMP 2012, Berlin.

Member of the Scientific Committee of the conference “Optimization: theory, algorithms and applications in economics”, 2011, Barcelona.

<http://mat.uab.cat/~opt2011/index.html>

Member of the Scientific Committee ICORES 2012, Portugal.

<http://www.icores.org/>

Member of the Scientific Committee of the French-German-Polish Optimization Congress 2013, Poland.

<http://www.fgp13.agh.edu.pl/>

## Teaching

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Master M2, Universidad de Chile, Optimization and Dynamical Systems, 2003

Master M2, Paris 6, École Polytechnique & ENSAE:

- Convex Analysis 2004-2009
- Tame Optimization 2009-2011

Master M2 Verona (2014)

- An introduction to first-order methods

Master M2 Eco-Math TSE:

- Optimization

## Research Activities

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Nonconvex and large scale optimization, tame optimization

Subgradient methods, gradient inequalities, Nonsmooth Analysis, Newton's Method

I have also participated to research articles related to Optimal Control, Game Theory, Economics and Environmental Sciences.

## Articles

1. F. Alvarez, H. Attouch, J. Bolte, P. Redont, *A second-order gradient-like dissipative dynamical system with Hessian-driven damping. Application to optimization and mechanics*, J. Math. Pures Appl., Vol. 81, no. 8, pp 747–779, 2002
2. H. Attouch, J. Bolte, P. Redont, *Optimizing properties of an inertial Dynamical system with Geometric Damping. Link with Proximal Methods*, Control and Cybernetics, Vol. 31, no. 3, Well-posedness in optimization and related topics (Warsaw, 2001), pp. 643–657, 2002.
3. J. Bolte, *Continuous gradient projection method in Hilbert Spaces*, Journal of Optimization Theory and Applications, Vol. 119, no. 2, pp. 235–259, 2003.
4. J. Bolte, M. Teboulle, *Barrier operators and associated gradient-like dynamical systems for constrained minimization problems*, SIAM Control and Optimization, Vol. 42, no 4, pp. 1266-1292, 2003.
5. F. Alvarez, J. Bolte, O. Brahic, *Hessian Riemannian gradient flows in convex programming*, SIAM Control and Optimization, Vol. 43, no. 2, pp 477-501, 2004.
6. H. Attouch, J. Bolte, P. Redont, M. Teboulle, *A singular Riemannian barrier method for constrained minimization*, Optimization, Vol. 53, no. 5-6, pp 435-454, 2004.
7. R.M. Semlali, J.B. Dessogne, F. Monna, J. Bolte, J., S. Azimi, N. Navarro, L. Denaix, M. Loubet, C. Chateau, C. and F. van Oort, *Modeling Lead Input and Output in Soils Using Lead Isotopic Geochemistry*, Environmental Science & Technology, Vol. 38, no 5, pp. 1513–1521, 2004.
8. J. Bolte, A. Daniilidis, A.S. Lewis, M. Shiota, *Clarke critical values of subanalytic Lipschitz continuous functions*, Annales Polonici Mathematici, Vol. 87, pp. 13-25, 2005.
9. J. Bolte, A. Daniilidis, A.S. Lewis, *A Morse-Sard theorem for non-differentiable subanalytic functions*, J. Math. Analysis Applications, Vol. 321, no. 2, pp 729-740, 2006.
10. J. Bolte, A. Daniilidis, A.S. Lewis, *The Lojasiewicz inequality for nonsmooth subanalytic functions with applications to subgradient dynamical systems*, SIAM Optimization, Vol. 17, no. 4, pp. 1205-1223, 2007.
11. J. Bolte, A. Daniilidis, A.S. Lewis, M. Shiota, *Clarke subgradients of stratifiable functions*, SIAM Optimization, Vol. 18, no. 2, pp. 556-572, 2007.
12. F. Alvarez, J. Bolte, J. Munier, *A Unifying Local Convergence Result for Newton's method in Riemannian Manifolds*, Foundations of Computational Mathematics, Vol. 8, no. 2, pp 197–226, 2008.

13. H. Attouch, J. Bolte, P. Redont, A. Soubeyran, *Alternating proximal algorithms for weakly coupled minimization problems. Applications to dynamical games and PDE's*, J. of Convex Analysis, Vol. 15, no. 3, pp. 485–506, 2008.
14. H. Attouch, J. Bolte, *On the convergence of the proximal algorithm for nonsmooth functions involving analytic features*, Math. Prog, Ser. B, Vol. 116, pp. 5–16, 2009.
15. J. Bolte, A. Daniilidis, A.S. Lewis, *Tame mappings are semismooth*, Math. Prog., Ser. B., Vol. 117, pp 5–19, 2009.
16. F. Monna, F. van Oort, P. Hubert, J. Dominik, J. Bolte, J.-L. Loizeau, J. Labanowski, J. Lamri, C. Petit, G. Le Roux, C. Chateau, *Modeling of 137Cs migration in soils using an 80-year soil archive: role of fertilizers and agricultural amendments*, Journal of Environmental Radioactivity, Vol. 100, no 1, pp. 9–16, 2009.
17. J. Bolte, A. Daniilidis, O. Ley, L. Mazet, *Characterizations of Lojasiewicz inequalities and applications*, Trans. Amer. Math. Soc., Vol. 362, no. 6, pp 3319–3363, 2010.
18. H. Attouch, J. Bolte, P. Redont, A. Soubeyran, *Proximal alternating minimization and projection methods for nonconvex problems: an approach based on the Kurdyka-Lojasiewicz inequality*, Mathematics of Operations Research, Vol. 35, no. 2, pp. 438–457, 2010.
19. J. Bolte, A. Daniilidis, A. Lewis, *Generic optimality conditions for semialgebraic convex programs*, Mathematics of Operations Research, Vol. 36, no. 1, pp. 55–70, 2011.
20. F. Alvarez, J. Bolte, F. Bonnans, F. Silva, *Asymptotic expansions for interior penalty solutions of control constrained linear-quadratic problems*, Math. Prog., Ser. A, Vol. 135, no 1-2, pp. 473–507, 2012.
21. H. Attouch, J. Bolte, B. Svaiter, *Convergence of descent methods for semi-algebraic and tame problems: proximal algorithms, forward-backward splitting, and regularized Gauss-Seidel methods*, Math. Prog., Ser. A, Vol. 137, no 1-2, pp. 91–129, 2013.
22. J. Bolte, S. Sabach and M. Teboulle, *Proximal alternating linearized method for nonconvex and nonsmooth problems*, Math. Prog., Ser. A, Vol. 146, no 1-2, pp 459–494, 2014.
23. J. Bolte, S. Gaubert, and G. Viger, *Definable zero-sum stochastic games*, Mathematics of Operations Research, Vol. 40, Issue 1, pp. 171-191, 2015
24. J. Bolte, P. Bégout, M.-A. Jendoubi, *On damped second-order gradient systems*, Journal of Differential Equations, Vol. 259, Issue 7, pp. 3115–3143, 2015.
25. J. Bolte, E. Pauwels, *Majorization-minimization procedures and convergence of SQP methods for semi-algebraic and tame programs*, Mathematics of Operations Research, Vol 41, Issue 1, pp. 442-465, 2016.
26. C. Bobtcheff, J. Bolte, T. Mariotti, *Researcher's dilemma*, “The Review of Economic Studies”, Volume 84, Issue 3, 1 July 2017, pp. 969–1014, 2017.
27. H.H. Bauschke, J. Bolte, M. Teboulle, *A descent Lemma beyond Lipschitz gradient continuity: first-order methods revisited and applications*, Mathematics of Operations Research, 42 (2), pp. 330–348, 2017
28. J. Bolte, T.-P. Nguyen, J. Peypouquet, B. Suter, *From error bounds to the complexity of first-order descent methods for convex functions*, Mathematical Programming, 17, Volume 165, Issue 2, pp. 471–507, 2017 (**preprint November 2015**).

29. J. Bolte, S. Sabach, M. Teboulle, *Nonconvex Lagrangian-based optimization: Monitoring schemes and global convergence* to appear in Mathematics of Operations Research, 2017
30. J. Bolte, S. Sabach, M. Teboulle, Y. Vaisbourd, *First order methods beyond convexity and Lipschitz gradient continuity with applications to quadratic inverse problems*, SIAM Journal on Optimization 28(3), pp. 2131–2151, 2018.
31. J. Bolte, A. Hochart, E. Pauwels, *Qualification conditions in semi-algebraic programming*, SIAM Journal on Optimization. Volume 28, Issue 2, pp. 1867–1891, 2018.
32. J. Bolte, A. Blanchet, *A family of functional inequalities: Lojasiewicz inequalities and displacement convex functions*, Volume 275, Issue 7, pp. 1650–1673 Journal of Functional Analysis, 2018.

## Proceedings

1. F. Alvarez, J. Bolte, F. Bonnans, F. Silva, *Error estimates for the solution of a control constrained optimal control problem with interior penalties*, Control Applications of Optimization, Vol. 7, University of Jyvaskyla, Finland, IFAC Workshop on Control Applications of Optimization, 2009.
2. J. Bolte, P. L. Combettes, and J.-C. Pesquet, *Alternating proximal algorithm for blind image recovery*, Proceedings of the IEEE International Conference on Image Processing. Hong-Kong, September 26-29, 2010.

## Working papers & Submitted papers

1. J. Bolte, Z. Chen, E. Pauwels, *The multiproximal linearization method for convex composite problems*.

## Conferences & Seminars

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### Conferences

- Universitat Autònoma de Barcelona, December 2002 : LEA Workshop on “Optimization, Games and Economic Applications” (Spain).
- “CECM Summer-meeting” Simon Fraser University, Vancouver (Canada).
- “SoMaChi meeting”, 2004, La Serena (Chile).
- MODOPT 2004, Temuco (Chile).
- FLACAM 2005, Santiago (Chile).
- ANR workshop, Optimization-Games-Economics Montpellier (2006) (France).
- Conference EURO XXI 2006, Reykjavik (Iceland), Session Organizer & Chairman.
- ANR workshop, “Numerical problems on Riemannian manifolds”, Toulouse, February 2007.
- Conference SMAI 2007, Praz-sur-Arly.
- Conference Nonconvex Programming: local and global approaches; Theory, Algorithms and Applications, Rouen, December 2007.
- MODE 2008, February 2008, Clermont-Ferrand.
- ANR workshop, “Optimization, Games and Decision dynamics with costs-to-move” Avignon (2007) (France).
- ANR workshop, “Dynamics and Optimization” Paris (2008) (France).
- Franco-Chilean Conference 2008, Université du Var, Toulon (France).



- Conference “Nonlinear Analysis and Optimization” at the occasion of the 60th birthday of A. Ioffe et S. Reich, Technion, Haifa (Israel) 2008.
- Conference at the occasion of the 60th birthday of Alain Haraux, march 2009, Hammamet, Tunisia.
- International Symposium of Mathematical Programming, Chicago, USA, August 2009.
- Workshop ANR, Banyuls, 1-2 avril 2010.
- Journées dynamiques et optimisation, November 28–29th 2011, Institut Henri Poincaré, Paris.
- SIAM Imaging meeting, 20-22th may, Philadelphia, 2012.
- International Symposium of Mathematical Programming (ISMP 2012), Berlin, August 19–23th 2012.
- 16th French-German-Polish Optimization Congress, Krakow, September 23-27th, 2013, Poland.
- Méthodes numériques et calcul effectif, en l’honneur de J.-P. Dedieu, Marseille (CIRM), October 28-31th, 2013
- SIAM Conference on Imaging Science, Hong Kong Baptist University, May 12th-14th, 2014
- Ottimizzazione e processi dinamici in apprendimento statistico e problemi inversi, Sestri-Levante, September 8th-12th, 2014.
- Optimisation non convexe, GDR Information Signal Image Vision, 16 septembre, 2014, Telecom ParisTech, Paris.
- Structured low rank approximation, Grenoble GIPSA, June 1–2nd 2015
- Real analytic geometry and trajectory of vector fields, CIRM Marseille, June 8–12th, 2015
- Nesterov 60th Birthday, Les Houches, January 2016
- Ben Tal 70th Birthday, Haifa, September 2016.
- International workshop on Mathematics and its applications, Yamaguchi University, Japan, November 2016
- Workshop Optimization: Fundamentals and Algorithms for Structured Problems, Toulouse, June 2018.
- ISMP July 2018, Bordeaux.
- Variational Analysis for Ioffe’s 80th birthday Erice August 2018.

## Seminars

U. Montpellier II 2001, 2002, 2003; Universidad de Chile (Santiago, Chile) 2002; U. Perpignan 2002, 2003; U. Limoges, 2001; U. Bordeaux I, 2002; U. Avignon, 2003; CECM, Simon Fraser University (Canada), 2003; U. Lyon I, Institut Girard Desargues, 2004; U. P. Sabatier, Toulouse, 2004; INRIA Rocquencourt, Paris, 2005; Séminaire Parisien d’Optimisation, (Paris I, VI, IX) 2005; Séminaire “Dynamiques globales”, Jacques Louis Lions, Paris 6, 2007; Séminaire de Géométrie, Université de Savoie / Chambéry, 2008; Séminaire d’Analyse de Brest, janvier 2009; Séminaire d’Analyse de l’Université d’Avignon, avril 2009; Séminaire de l’IMT, Toulouse III, avril 2009, MAD Seminar U. Toulouse I, 2010; Machine learning seminar, École Polytechnique Fédérale de Lausanne 2012; Séminaire Parisien de Théorie des Jeux, IHP, (Paris 6/7, Dauphine, X, HEC) 2013; Kolloquium, Göttingen University, Germany 2013; Griffiss Center, Rome, NY, AFRL, 2014; Syracuse University, NY, 2014; Mathematics seminar, EPFL 2015; Analysis Seminar, Sevilla, 2016; Machine Learning, IIT, Genoa, 2017; Mokameeting, INRIA, 2017, Paris.