

Curriculum vitæ of Jean-Baptiste Caillau

Born May 24, 1973 (France)
Professor of applied mathematics
LJAD, Univ. Côte d'Azur & CNRS/Inria
Parc Valrose, F-06108 Nice
`caillau.perso.math.cnrs.fr`

Scientific interests

Optimization and optimal control: Geometry, algorithms and applications

Academic positions

Since September 2017, Professor Univ. Côte d'Azur
Member of the CNRS team Géométrie, Analyse et Dynamique, LJAD¹
Member of the Applied Math. and Modelling department, Polytech Nice-Sophia
Member of the Inria team McTAO,² Sophia Antipolis
Member of the Technion & Inria joint team GCAM,³ Haifa & Sophia Antipolis
Associate, CNRS team Algo. Parallèles et Optimisation, Univ. Toulouse
2016-2017 On leave (Inria) at Sophia Antipolis
2013-2014 On leave (CNRS) at Lab. J.-L. Lions, Univ. Paris VI
2008-2017 Prof. Univ. Bourgogne Franche-Comté
2001-2007 Assistant prof. Univ. Toulouse

Education

2006 Habilitation applied math. Univ. Toulouse
2000 PhD applied math. Univ. Toulouse (supervisor J. Noailles)
1997 Master math. Univ. Toulouse
1996 Master scientific comp. Univ. Toulouse
1996 Ingénieur ENSEEIHT⁴ applied math. & sci. computing (major)

Distinctions

2001 Maury prize, Académie des Sciences de Toulouse
2000 Léopold Escande prize, Institut National Polytechnique de Toulouse

1 Publications

Journal papers

[1a] Sensitivity analysis for time optimal orbit transfer. *Optimization* **49**
(2001), no. 4, 327–350 (with Noailles, J.)

¹Labo. J. A. Dieudonné

²Mathematics for Control, Transport and Applications

³Geometric Control and Applications in Mechanics

⁴École Nationale Supérieure d'Électronique, Électrotechnique, Informatique, Hydraulique et Télécommunications

- [2a] Coplanar control of a satellite around the Earth. *ESAIM Control Optim. and Calc. Var.* **6** (2001), 239–258 (with Noailles, J.)
- [3a] 3D Geosynchronous Transfer of a Satellite: Continuation on the Thrust. *J. Optim. Theory Appl.* **118** (2003), no. 3, 541–565 (with Gergaud, J.; Noailles, J.)
- [4a] Geometric optimal control of elliptic Keplerian orbits. *Discrete Contin. Dyn. Syst. Ser. B* **5** (2005), no. 4, 929–956 (with Bonnard, B.; Trélat, E.)
- [5a] Energy minimization of single input orbit transfer by averaging and continuation. *Bull. Sci. Math.* **130** (2006), no. 8, 707–719 (with Bonnard, B.; Dujol, R.)
- [6a] Averaging and optimal control of elliptic Keplerian orbits with low propulsion. *Systems Control Lett.* **55** (2006), no. 9, 755–760 (with Bonnard, B.; Dujol, R.)
- [7a] Second order optimality conditions in the smooth case and applications in optimal control. *ESAIM Control Optim. and Calc. Var.* **13** (2007), no. 2, 207–236 (with Bonnard, B.; Trélat, E.)
- [8a] Riemannian metric of the averaged energy minimization problem in orbital transfer with low thrust. *Ann. Inst. H. Poincaré Anal. Non Linéaire* **24** (2007), no. 3, 395–411 (with Bonnard, B.)
- [9a] Optimality results in orbit transfer. *C. R. Acad. Sci. Paris, Ser. I* **345** (2007), 319–324 (with Bonnard, B.)
- [10a] Geodesic flow of the averaged controlled Kepler equation. *Forum Math.* **21** (2009), no. 5, 797–814 (with Bonnard, B.)
- [11a] Conjugate and cut loci of a two-sphere of revolution with application to optimal control. *Ann. Inst. H. Poincaré Anal. Non Linéaire* **26** (2009), no. 4, 1081–1098 (with Bonnard, B.; Sinclair, R.; Tanaka, M.)
- [12a] Geometric and numerical techniques in optimal control of two and three-body problems. *Commun. Inf. Syst.* **10** (2010), no. 4, 239–278 (with Bonnard, B.; Picot, G.)
- [13a] Convexity of injectivity domains on the ellipsoid of revolution: The oblate case. *C. R. Acad. Sci. Paris, Ser. I* **348** (2010), 1315–1318 (with Bonnard, B.; Rifford, L.)
- [14a] Differential pathfollowing for regular optimal control problems. *Optim. Methods Softw.* **27** (2012), no. 2, 177–196 (with Cots, O.; Gergaud, J.)
- [15a] Minimum time control of the restricted three-body problem. *SIAM J. Control Optim.* **50** (2012), no. 6, 3178–3202 (with Daoud, B.)
- [16a] Minimum fuel control of the planar circular restricted three-body problem. *Celestial Mech. Dynam. Astronom.* **114** (2012), no. 1, 137–150 (with Daoud, B.; Gergaud, J.)

- [17a] Riemannian metrics on two-spheres and extensions with applications to optimal control. *ESAIM Control Optim. and Calc. Var.* **19** (2013), no. 2, 533–554 (with Bonnard, B.; Janin, G.)
- [18a] Metrics with equatorial singularities on the sphere. *Ann. Mat. Pura Appl.* **193** (2014), no. 5, 1353–1382 (with Bonnard, B.)
- [19a] L^1 -minimization for mechanical systems. *SIAM J. Control Optim.* **54** (2016), no. 3, 1245–1265 (with Chen, Z.; Chitour, Y.)
- [20a] Solving chance-constrained optimal control problems in aerospace via Kernel Density Estimation. In revision for *Optimal Control Appl. Methods* (with Cerf, M.; Sassi, A.; Trélat, E.; Zidani, H.)
- [21a] Non-integrability of the minimum time Kepler problem. In revision for *J. Geom. Phys.* (with Combot, T.; Féjoz, J.; Orioux, M.)
- [22a] Clustering with feature selection using alternating minimization. Application to computational biology. Preprint (with Barlaud, M.; Deprez, M.; Gilet, C.)
- [23a] Maximal determinants of Schrödinger operators. Preprint (with Aldana, C.; Freitas, P.)
- [24a] Metric approximation of minimum time control systems. Preprint (with Pomet, J.-B.; Rouot, J.)
- [25a] Singularities of min time control affine systems. Preprint (with Féjoz, J.; Orioux, M.; Roussarie, R.)

Edited volumes

- [1b] Special issue in the honor of Bernard Bonnard. Part I and II. *Math. Control Relat. Fields* **3** (2013), no. 3-4 (with Chyba, M.; Sugny, D.; Trélat, E.)
- [2b] Special issue on New trends in optimal control. *Discrete Contin. Dyn. Syst. Ser. A* **35** (2015), no. 9 (with Grüne, L.; do Rosario de Pinho, M.; Trélat, E.; Zidani, H.)
- [3b] *Variational methods in imaging and geometric control*, Radon Series on Comput. and Applied Math. **18**, de Gruyter, 2017 (with Bergounioux, M.; Peyré, G.; Schnörr, C.; Haberkorn, T.)

Proceedings and book chapters

- [1c] Continuous optimal control sensitivity analysis with AD. *Automatic Differentiation: From Simulation to Optimization*, 109–117, Springer, 2002 (with Noailles, J.) Proceedings of AD'2000, Nice, June 2000.
- [2c] Wavelets for adaptive solution of boundary value problems. *Proceedings of the 16th IMACS World Congress*, 1–6, Lausanne, August 2000 (with Noailles, J.)

- [3c] Numerical control and orbital transfers. *Sonderforschungsbereich 255: Transatmosphärische Flugsysteme*, 39–49, Hieronymus München, 2002 (with Gergaud, J.; Noailles, J.) Proceedings of the Optimal Control Workshop, Greifswald, October 2002.
- [4c] Minimum time control of the Kepler equation. *Unsolved Problems in Mathematical Systems and Control Theory*, 89–92, Princeton University Press, 2004 (with Gergaud, J.; Noailles, J.)
- [5c] Computation of conjugate times in smooth optimal control: The `cotcot` algorithm. *Proceedings of the 44th IEEE Conference on Decision and Control and European Control Conference ECC 2005*, 929–933, Seville, December 2005 (with Bonnard, B.; Trélat, E.)
- [6c] Introduction to nonlinear optimal control. *Advanced topics in control systems theory*, 1–60, Lecture Notes in Control and Inform. Sci. **328**, Springer, 2006 (with Bonnard, B.)
- [7c] Riemannian metric of the averaged controlled Kepler equation. *Systems, Control, Modeling and Optimization*, 79–89, IFIP Int. Fed. Inf. Process. **202**, Springer, 2006 (with Bonnard, B.; Dujol, R.) Proceedings of the 22nd IFIP TC 7 conference, Turin, July 2005.
- [8c] Averaging and optimal control of elliptic Keplerian orbits with low propulsion. *Int. J. Tomogr. Stat.* **5** (2007), no. W07, 20–25 (with Bonnard, B.; Dujol, R.) Proceedings of the 13th IFAC Workshop on Control Applications of Optimisation, Paris, April 2006.
- [9c] Smooth homotopies for single-input time optimal orbital transfer. *Int. J. Tomogr. Stat.* **5** (2007), no. W07, 26–31 (with Bonnard, B.; Dujol, R.) Proceedings of the 13th IFAC Workshop on Control Applications of Optimisation, Paris, April 2006.
- [10c] Smooth approximations of single-input controlled Keplerian trajectories: homotopies and averaging. *Taming heterogeneity and complexity of embedded control*, 73–95, International Scientific and Technical Encyclopedia, 2007 (with Bonnard, B.; Dujol, R.) Proceedings of the Joint CTS-HYCON Workshop on Nonlinear and Hybrid Control, Paris, July 2006.
- [11c] Second order optimality conditions in optimal control with applications. *Discrete Contin. Dyn. Syst. suppl.* (2007), 145–154 (with Bonnard, B.; Trélat, E.) Proceedings of the 6th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Poitiers, June 2006.
- [12c] Remarks on quadratic Hamiltonians in spaceflight mechanics. *Lagrangian and Hamiltonian Methods for Nonlinear Control*, 365–373, Lecture Notes in Control and Inform. Sci. **366**, Springer, 2007 (with Bonnard, B.; Dujol, R.) Proceedings of the 3rd IFAC Workshop on Lagrangian and Hamiltonian Methods for Nonlinear Control, Nagoya, July 2006.
- [13c] On some Riemannian aspects of two and three-body controlled problems. *Recent Advances in Optimization and its Applications in Engineering*, 205–224, Springer, 2010 (with Daoud, B.; Gergaud, J.) Proceedings of

the 14th Belgium-Franco-German conference on Optimization, Leuven, September 2009.

- [14c] Discrete and differential homotopy in circular restricted three-body control. *Discrete Contin. Dyn. Syst. suppl.* (2011), 229–239 (with Daoud, B.; Gergaud, J.) Proceedings of 8th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Dresden, May 2010.
- [15c] Energy minimization in two-level dissipative quantum control: The integrable case. *Discrete Contin. Dyn. Syst. suppl.* (2011), 198–208 (with Bonnard, B.; Cots, O.) Proceedings of 8th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Dresden, May 2010.
- [16c] On the injectivity and nonfocal domains of the ellipsoid of revolution. *Geometric Control Theory and Sub-Riemannian Geometry*, 73–85, INdAM Series **5**, Springer, 2014 (with Royer, C. W.) Proceedings of the INdAM meeting on Geometric Control and sub-Riemannian geometry, Cortona, May 2012.
- [17c] On local optima in minimum time control of the restricted three-body problem. *Recent Advances in Celestial and Space Mechanics*, 209–302, Mathematics for industry **23**, Springer, 2016 (with Farrés, A.)
- [18c] Approximation by filtering in optimal control and applications. *IFAC PapersOnLine* **50** (2017), no. 1, 1649–1654 (with Dargent, T.; Nicolau, F.) Proceedings of the 20th IFAC world congress, Toulouse, July 2017

Softwares

- [1d] `wasp`: Wavelet Adaptive Solver for boundary value Problems. apo.enseeiht.fr/wasp
- [2d] `tfmin`: Minimum time orbit transfer. apo.enseeiht.fr/tfmin
- [3d] `cotcot`: Conditions of Order Two, CONjugate Times. apo.enseeiht.fr/cotcot (with Bonnard, B.; Trélat, E.)
- [4d] `hampath`: Path following for Hamiltonian boundary value problems. hampath.org (with Cots, O.; Gergaud, J.)

2 Teaching and supervision

Undergraduate

Since 1996, I have been teaching mathematics and scientific computing at all levels in various places (grandes écoles and university): ENSEEIHT (Univ. Toulouse), Univ. Bourgogne, ISAE,⁵ ENAC,⁶ ENSTA⁷ ParisTech, Polytech Nice-Sophia (Univ. Côte d’Azur), CNAM, classes préparatoires. I regularly deliver talks on mathematics and their applications in high schools or colleges.

⁵Institut Supérieur de l’Aéronautique et de l’Espace (previously Supaéro and ENSICA)

⁶École Nationale de l’Aviation Civile

⁷École Nationale Supérieure des Techniques Avancées

Graduate

- 2007-2008 Univ. Bourgogne, *Carnot Doctoral School*. Contrôle optimal et applications I.
- 2009-2010 Univ. Bourgogne, *Carnot Doctoral School*. Contrôle optimal et applications II.
- 2012-2013 *7ème école d'été de Peyresq en traitement du signal et des images*. Contrôle optimal : introduction au cas déterministe en dimension finie.
- 2013-2014 Institut Henri Poincaré, *Gravasco trimester*. Introduction to optimal control and application to space mechanics.

PhD theses and postdocs

- 2003-2006 Romain Dujol, PhD Univ. Toulouse, (co-supervision B. Bonnard). Supported by French Ministry for Higher Education & Research. Now Lecturer at École Internationale des Sciences du Traitement de l'Information (Pau).
- 2008-2011 Bilel Daoud, PhD Univ. Bourgogne (co-supervision J. Gergaud). Supported by French Ministry for Higher Education & Research (grant no. 31716-2008). Now engineer at Astek (Antibes).
- 2009-2012 Olivier Cots, PhD Univ. Bourgogne (co-supervision J. Gergaud). Supported by Conseil Régional de Bourgogne (grant no. 2009-160E-160-CE-160T). Now Lecturer at Univ. Toulouse.
- 2012-2013 Ariadna Farrés, postdoc Univ. Bourgogne. Supported by Conseil Régional de Bourgogne (grant no. 9201AAO049S0273). Now visiting research scientist at NASA.
- 2013-2016 Zheng Chen, PhD Univ. Paris-Saclay (co-supervision Y. Chitour). Supported by Chinese Scholarship Council (grant no. 2013 0629 0024). Now postdoc at Technion.
- 2013-2016 Achille Sassi, PhD Univ. Paris-Saclay (co-supervision E. Trélat and H. Zidani). Supported by Airbus Safran Launchers. Now R&D engineer at Uppli.
- 2015-2016 Florentina Nicolau, postdoc Inria Sophia (co-supervision J.-B. Pomet). Supported by CNES (contract no. R-S13/BS-005-012). Now Lecturer at Univ. Cergy-Pontoise.
- 2015-2018 Michaël Orioux, PhD Univ. Paris-Dauphine (co-supervision J. Féjóz). Supported by French Ministry for Higher Education & Research (ENS Cachan).
- 2017-2018 Lamberto Dell'Elce, postdoc Inria Sophia (co-supervision J.-B. Pomet). Supported by CNES (contract no. R-S13/BS-005-012), Inria, UCA MSI and Thalès Alenia Space.

3 Dissemination of research

Projects

- 1998-2001 CNES Toulouse (contract no. 86/776/98/CNES/7462), Low thrust orbit transfer I (with J. Noailles and J. Gergaud)
- 2002-2005 CNES Toulouse (contract no. 02/CNES/0257/00), Low thrust orbit transfer II (with J. Noailles and J. Gergaud)
- 2004-2005 BQR INP Toulouse, Analysis of multi-fractal signals in electromagnetism (with D. Ruiz)
- 2005-2008 Thales Toulouse (contract no. 00778), Flight plan optimization (with J. Noailles and J. Gergaud)
- 2006-2007 EADS-Astrium Space Transportation Les Mureaux, Min. consumption orbit transfer I (with B. Bonnard, J. Gergaud, E. Trélat and C. Zayane)
- 2006-2008 CNES Évry, Jacobi approaches for discontinuous extremals (with J. Gergaud and G. Janin)
- 2009-2010 EADS-Astrium Space Transportation Les Mureaux, Minimum consumption orbit transfer II (with B. Daoud and J. Gergaud)
- 2009-2012 Conseil Régional de Bourgogne (contract no. 2009-160E-160-CE-160T), programme FABER
- 2009-2013 ANR programme blanc (project no. NT09 504490), Geometric Control Methods (PI U. Boscaïn)
- 2010-2012 ADT Inria, BOCOP optimal control toolbox (PI P. Martinon)
- 2011-2012 BQR Univ. Bourgogne, Contrôle optimal des spins et applications en imagerie par résonance magnétique nucléaire (PI D. Sugny)
- 2011-2014 SADCO Initial Training Network (FP7 grant no. 264735-SADCO), Sensitivity Analysis for Deterministic Controller Design (PI H. Zidani)
- 2014-2017 CNES Toulouse (contract no. R-S13/BS-005-012), Perturbations & averaging for low thrust (with J.-B. Pomet)
- 2015-2016 AMIES Labex (PEPS), Mathematics for smart energy at home (with C. Prud'homme and an industrial partner)
- 2016-2017 AMIES Labex (PEPS), Dealing with exclusion constraints in orbital transfer (with Thales Alenia Space Cannes)
- 2016-2018 PGMO (Fondation Mathématique J. Hadamard) grant no. 2016-1753H on "Metric approximation of minimizing trajectories and applications"
- 2016-2019 FCT grant no. PTDC/MAT-CAL/4334/2014, Extremal spectral quantities and related problems (PI P. Freitas)

- 2017-2018 UCA MSI (PEPS), Effet des résonances sur la moyennisation en contrôle optimal appliqué à la mécanique spatiale (with Inria and Thales Alenia Space Cannes)
- 2017-2021 ANR Maximic, Optimal control of microbial cells by natural and synthetic strategies (PI H. De Jong)
- 2018-2021 GCAM associated team between Technion and Inria, Geometric Control and Applications in Mechanics (micro-swimming and aerospace) (PI L. Giraldi)

Conference organization

- 09/2007 Mini-sympos. "Optimal control", *13th Czech-Franco-German conference on Optimization*, Heidelberg (with Gergaud, J.)
- 01/2008 Séminaire Résonances, *CCT mécanique orbitale*, CNES Toulouse (with Lamy, A.)
- 06/2008 *Workshop on space and quantum dynamics*, Dijon (with Bonnard, B.; Sugny, D.)
- 03/2011 *SADCO Workshop on aerospace applications of control and optimization*, Paris (with Cerf, M.; Zidani, H.)
- 05/2011 Mini-symposium "Optimisation de trajectoires en mécanique spatiale", *Congrès SMAI*, Guidel (with Haberkorn, T.)
- 09/2011 Mini-symposia "Analytic and geometric optimal control I-II", *IFIP 2011*, Berlin (with Boscain, U.)
- 03/2012 Session Industrielle, *Journées SMAI-MODE*, Dijon
- 04/2012 *Spring school and Workshop on Numerical Methods in Control*, Paris, (with Bonnans, J. F.; Trélat, E.; Zidani, H.)
- 06/2012 *Contrôle optimal géométrique*, Dijon (with Chyba, M.; Sugny, D.; Trélat, E.)
- 05/2013 Mini-symposium "Optimisation en aéronautique et mécanique spatiale", *Congrès SMAI*, Seignosse
- 07/2014 *New trends in optimal control (NETCO'2014)*, Tours (with Barles, G.; Briani, A.; Cardaliaguet, P.; Ley, O.; Trélat, E.; Zidani, H.)
- 11/2014 *Geometric control and related fields*, Linz (with Bergounioux, M.; Haberkorn, T.)
- 01/2015 *Journée équipe McTAO*, Dijon (with Bonnard, B.; Pomet, J.-B.; Rifford, L.)
- 06/2015 Mini-symposium "Contrôle et applications", *Congrès SMAI*, Les Karellis
- 06/2015 *17th British-French-German Conference on Optimization*, London (member of Scientific Committee)

- 06/2015 *Journée du GT Programmation Mathématique du GdR RO*, Dijon (with Barbara, A.; Cabot, A.; Jourani, A.)
- 12/2015 *Journées du GdR MOA*, Dijon (with Barbara, A.; Cabot, A.; Jourani, A.; Vaïter, S.)
- 01/2016 *10th International Young Researcher Workshop on Geometry, Mechanics and Control*, Paris (IHP) (with Gay-Balmaz, F.; Jean, F.; Marco, J.-P.)
- 01/2016 *Journée équipe McTAO*, Sophia Antipolis (with Bonnard, B.; Giraldi, L.; Pomet, J.-B.; Rifford, L.)
- 08/2016 *The cut locus: A bridge over differential geometry, optimal control and transport*, Bangkok (with Bonnard, B.; Kondo, K.; Rifford, L.; Tanaka, M.)
- 10/2016 *Journée équipes MokaPlan-McTAO*, Paris (with Carlier, G.; Pomet, J.-B.)
- 01/2017 *Première journée SMAI MAS-MODE*, Paris (with Le Penneç, E.)
- 09/2017 Mini-symposium "Geometric control & applications", *18th French-German-Italian conference on optimization*, Paderborn
- 11/2017 Mini-symposium "Optimal control & applications to biology", *PG-MO days 2017*, Paris Saclay
- 07/2018 Session on "Optimal Control and PDE Constrained Optimization", *ISMP 2018*, Bordeaux (with Zidani, H.)
- 09/2018 *The cut locus 2018*, Sapporo (with Kondo, K.; Ohta, S.-I.; Rifford, L.; Sabau, S.; Tanaka, M.)
- 09/2019 *19th French-German-X conference on optimization*, Nice (with Auroux, D.)

Talks

- 06/1998 *Séminaire CESAME*, Leuven
- 06/1999 *Nonlinear Sciences on the Border of Milleniums*, Saint-Petersburg
- 10/1999 *6th International Conference on Parametric Optimization and Related Topics*, Dubrovnik
- 03/2000 *Journées SMAI-MODE*, Toulouse
- 05/2000 *Nonlinear Analysis 2000*, New-York
- 02/2001 *Séminaire MIP*, Toulouse
- 05/2001 *3rd Workshop on Stability and Sensitivity of Optimal Control Problems*, Burg
- 01/2002 *Journées Commande*, Orléans
- 12/2003 *23rd Interdisc. Meeting on Anti-infectious Chemotherapy (RICAI)*, Paris (with Augot, A.; Bernier, M.; Noailles, J.; Philippon, A.)
- 07/2004 *First joint Canada-France meeting of the mathematical sciences*, Toulouse (with Dujol, R.; Gergaud, J.; Haberkorn, T.; Martinon, P.; Noailles, J.; Preda, D.)

- 05/2005 *Congrès SMAI, Évian*
- 03/2006 *Séminaire Équa. diff. et contrôle, Dijon*
- 03/2007 *Séminaire ERIM, Nouméa*
- 04/2007 *Séminaire Équa. diff. et contrôle, Dijon*
- 05/2007 *Workshop on Control, Optimization and Stability of Non-linear Systems: Geometric and Analytic Methods, Trieste*
- 06/2007 *Mathematical Control Theory and Mechanics, Suzdal*
- 09/2007 *13th Czech-Franco-German conference on Optimization, Heidelberg*
- 05/2008 *Journées Bordeaux-Pau-Toulouse, Anglet*
- 05/2008 *Aerospatial dynamics and Optimal Control, Paris*
- 06/2008 *Differential equations and topology (dedicated to the centennial anniversary of L. S. Pontryagin), Moscow*
- 11/2008 *Séminaire Astronomie et Systèmes Dynamiques, Observatoire de Paris*
- 03/2009 *Journées math. Besançon-Dijon, Dijon*
- 09/2009 *14th Belgium-Franco-German conference on Optimization, Leuven*
- 03/2010 *Colloquium Institut math. de Bourgogne, Dijon*
- 02/2011 *Séminaire Commands, Paris*
- 06/2011 *New Trends in Astrodynamics and Applications VI, New-York*
- 07/2011 *SIAM Control, Baltimore (with Cerf, M.; Daoud, B.)*
- 08/2011 *Equadiff, Loughborough*
- 09/2011 *25th IFIP TC 7 Conference on System Modelling and Optimization, Berlin*
- 10/2011 *Conférence du Laboratoire International Associé Franco-Maghrébin du CNRS, Nice*
- 03/2012 *Journées SMAI-MODE, Dijon*
- 02/2013 *Groupe de travail Contrôle, Paris*
- 03/2013 *Séminaire de géométrie hamiltonienne, Paris*
- 04/2013 *Séminaire Parisien d'Optimisation, Paris*
- 09/2013 *Workshop on optimal and model predictive control, Bayreuth*
- 09/2013 *CELMEC VI, Viterbo (with Farrés, A.)*
- 12/2013 *Séminaire Stats, Contrôle, Opti. et Probas, Dijon*
- 12/2013 *Séminaire Lab. J.-L. Lions, Paris*
- 03/2014 *Journées SMAI-MODE, Rennes*
- 05/2014 *Séminaire de géométrie sous-Riemannienne, Paris*
- 05/2014 *Séminaire ROMA de l'ISAE, Toulouse*
- 07/2014 *10th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Madrid*
- 07/2014 *12th EUROPT Workshop on Advances in Continuous Optimization, Perpignan*
- 09/2014 *Séminaire "Temps et espace" de l'Observatoire, Paris*
- 11/2014 *Workshop "Non-holonomic Mechanics and Geometric Optimal Control", IHP trimester on "Geometry, Analysis and Dynamics on Sub-Riemannian Manifolds", Paris*
- 06/2015 *17th British-French-German Conference on Optimization, London*
- 06/2015 *Rencontres mathématiques de Rouen, Rouen*
- 07/2015 *SIAM Conference on Control and its applications, Paris*
- 09/2015 *Séminaire SPOT, Toulouse*
- 03/2016 *Séminaire Dynamique et géométrie, Nice*
- 04/2016 *Séminaire de géométrie hamiltonienne, Paris*

- 05/2016 *Emerging Trends in Applied Mathematics and Mechanics*, Perpignan
- 06/2016 *Alicante-Limoges-Elche Meeting on Optimization*, Cartagena
- 08/2016 *The cut locus: A bridge over differential geometry, optimal control and transport*, Bangkok
- 09/2016 *Séminaire Astrogéo*, Sophia Antipolis
- 11/2016 *PGMO Days 2016*, Paris Saclay
- 02/2017 *Séminaire ENAC*, Toulouse
- 06/2017 *Mathematical Control Theory*, Porquerolles
- 07/2017 *New Horizons on Optimal Control*, Porto
- 09/2017 *CELMEC VII*, San Martino (with Dell'Elce, L.; Pomet, J.-B.)
- 11/2017 *PGMO Days 2017*, Paris Saclay (with Barlaud, M.; Gilet, C.)
- 12/2017 *10th NIPS Workshop on Optimization for Machine Learning*, Los Angeles (with Barlaud, M.; Deprez, M.; Gilet, C.)
- 01/2018 *UCA Complex days*, Nice
- 02/2018 *Recent advances in Hamiltonian dynamics and symplectic topology*, Padova
- 03/2018 *Journées SMAI-MODE*, Autrans (with Dell'Elce, L.; Pomet, J.-B.; also with Barlaud, M.; Deprez, M.; Gilet, C.)
- 06/2018 *20th European Conference on Mathematics for Industry*, Budapest (with Dollé, G.; Prud'homme, C.)

High school & college audience

- 05/2011 *Lycée Stephen Liégeard*, Brochon
- 04/2012 *Lycée Eiffel*, Dijon
- 06/2013 Stage MathC2+ "Trop fort les maths", Institut math., Dijon
- 03/2014 *Lycée Hyppolite Fontaine*, Dijon
- 03/2015 *Lycée de Gaulle*, Dijon
- 05/2015 *Lycée Antoine*, Chenove
- 03/2016 *Lycée de Gaulle*, Dijon
- 06/2017 Stage MathC2+, Inria Sophia Antipolis
- 10/2017 *Lycée Amiral*, Grasse

Short notes in "Mathématiques de la planète terre":

- *Tout autour de la terre*
breves-de-maths.fr/tout-autour-de-la-terre
- *Un ellipsoïde peut en cacher un autre*
breves-de-maths.fr/tout-autour-de-la-terre-2nde-partie
- *De la terre à la lune*
breves-de-maths.fr/de-la-terre-a-la-lune

4 Academic service

Scientific

- 1999-2000 Conseil Scientifique Univ. Toulouse IV
- 2005-2007 Conseil de laboratoire IRIT
- 2010-2013 Comité direction Institut math. Bourgogne, responsable financier

- 2010-2013 Bureau Commission de proposition (math.) Univ. Bourgogne
- 2010-2017 Conseil de laboratoire Institut math. Bourgogne
- 2010 — Comités de sélection 26ème section (Dijon, Marseille, Orléans, Paris, Toulouse...)
- 2011-2017 Groupe SMAI-MODE, responsable (2013-2016)
- 2012-2013 Séminaire Contrôle, Optimisation, Transport, Institut math. Bourgogne, organizer
- 2013-2016 Labex AMIES, industrial correspondent
- 2015-2017 Équipe CNRS Statistique, Probabilités, Optimisation & Contrôle, Institut math. Bourgogne, joint head
- 2016-2017 Séminaire de géométrie hamiltonienne de Paris VI, co-organizer
- 2016 — Conseil scientifique du GdR Calcul
- 2016 — Conseil scientifique de l'Institut de Mécanique Céleste et de Calcul des Éphémérides (Observatoire de Paris)
- 2017 — Conseil scientifique du PGMO de la Fondation Mathématique Jacques Hadamard
- 2017 — Centre Spatial Universitaire UCA (projet CubeSat)
- 2018 Jury du prix de thèse PGMO

Pedagogical

- 2005-2007 3ème année math. ENSEEIHT internships, responsable
- 2006-2007 2ème année majeure math. ENSEEIHT, responsable
- 2009-2013 L2 math. Univ. Bourgogne, responsable
- 2014-2016 L1 math. Univ. Bourgogne, responsable
- 2014-2016 Master 2 math. applis Univ. Bourgogne, responsable
- 2014-2016 Conseil UFR Math. & Info., Univ. Paris I
- 2014-2017 Conseil pédagogique département math. Univ. Bourgogne
- 2018 — Jury de l'agrégation de mathématiques