

Curriculum vitae - François Lalonde

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DIPLÔMES

Baccalauréat (physique), Université de Montréal, 1976
Propédeutique (mathématiques), Université de Montréal, 1977
Maîtrise (logique et informatique mathématique, NP-complétude), Université de Montréal, 1979
Doctorat d'Etat (mathématiques - topologie différentielle), Centre d'Orsay, Université de Paris, 1985.

POSTES OCCUPÉS

Titulaire, Chaire de recherche du Canada en géométrie et topologie symplectiques, Université de Montréal, depuis mars 2001.

Professeur titulaire, Département de Mathématiques et de Statistique, Université de Montréal, depuis mars 2001.

Directeur, Centre de recherches mathématiques (CRM), 2004–2008.

Directeur, Institut des Sciences Mathématiques (regroupant les universités Concordia, McGill, Montréal, UQAM, Laval et Sherbrooke), 1996 - 2000.

Professeur titulaire (1991-2001) et chercheur-boursier du CRSNG (1985-1991), Département de Mathématiques, Université du Québec à Montréal.

POSTES INVITES

Professeur des universités de France, Ecole Normale Supérieure, Lyon, 2008-2009.

Professeur invité, Stanford University, automne 2005.

Chercheur invité CNRS, Université d'Aix-Marseille, printemps 2002

Chercheur invité CNRS, Ecole Polytechnique de Paris (Palaiseau), automne 2001 – hiver 2002

Chercheur résident, Fields Institute, 2000-2001.

Chercheur invité, Tel Aviv University, automne 1997 et printemps 1999.

Chercheur invité CNRS, Université Louis-Pasteur, Strasbourg, mai-juin 1990.

Chercheur visiteur, Department of Mathematics, Harvard University, 1989–1990.

Professeur associé, Centre d'Orsay, Université de Paris, 1984-85.

Chercheur invité, IHES, 1983-85.

PUBLICATIONS

Note: The Cluster research project with O. Cornea is expected to spread over a few years, there are a few papers related to this project in preparation – the preprint with O. Cornea below will be re-written, the others are currently in preparation. Most of the recent papers can be found on ArXiv.

Articles and preprints

S. Hu and F. Lalonde, *Homological Lagrangian monodromy*, preprint 2009, submitted.

S. Hu and F. Lalonde, A relative Seidel morphism and the Albers map, *Trans. Amer. Math. Soc.* **362** (2009), 1135-1168.

S. Anjos, F. Lalonde and M. Pinsonnault, The homotopy type of the space of symplectic balls in rational ruled 4-manifolds, *Geometry and Topology* **13** (2009), 1177–1227.

S. Anjos and F. Lalonde, *The full homotopy type of symplectic balls in $S^2 \times S^2$ above the critical value*, preprint arXiv:math/0406129, 23 pages, 2008.

S. Hu and F. Lalonde, Anti-symplectic involution and Maslov indices, preprint, 18 pages, 2008

S. Anjos and F. Lalonde, The topology of the space of symplectic balls in $S^2 \times S^2$, C. R. Acad. Sci. Paris, Ser. I **345** (2007) 639-642.

- F. Lalonde, *Lagrangian submanifolds: from the local model to the cluster complex*, Proceedings of the International Congress of Mathematicians, Madrid 2006, published by the European Mathematical Society, 2006, pp 456 – 477.
- O. Cornea and F. Lalonde, Cluster Homology, ArXiv Math.SG/0508345, 56 pages, 2006.
- O. Cornea and F. Lalonde, Cluster homology: an overview of the construction and results, ERA – AMS 12 (2006), 1 – 12.
- F. Lalonde, A field theory for symplectic fibrations over surfaces with applications, *Geometry and Topology* 8 (2004), 1189 – 1226.
- F. Lalonde and M. Pinsonnault, The topology of the space of symplectic balls in rational 4-manifolds, *Duke Mathematical Journal* **122** (2004), 347–397.
- E. Kerman and F. Lalonde, Length minimising paths for symplectically aspherical manifolds, *Ann. Inst. Fourier* **53** (2003), 1503–1526.
- F. Lalonde and D. McDuff, Symplectic structures on fiber bundles, *Topology* **42** (2003), 309 – 347.
- F. Lalonde and M. Pinsonnault, Groupes d’automorphismes et plongements symplectiques de boules dans les variétés rationnelles, *C.R. Acad. Sci. Paris, Ser. I* **335** (2002), 931 – 934.
- F. Lalonde and D. McDuff, Cohomological properties of ruled symplectic structures on manifolds, Mirror Symmetry IV, AMS/IP Studies in Advanced Mathematics **33** (2002), 79 – 99.
- D. Gatien and F. Lalonde, Holomorphic cylinders with Lagrangian boundaries and Hamiltonian dynamics, *Duke Mathematical Journal* **102** (2000), 485 – 511.
- F. Lalonde, D. McDuff and L. Polterovich, Topological rigidity of Hamiltonian loops and quantum homology, *Inventiones Mathematicae* **135** (1999), 369–385.
- F. Lalonde et C. Pestieau, Stabilisation of symplectic inequalities and applications, in *Amer. Math. Soc. Translations, Series 2, Volume 196* (1999) pp. 63-72.
- F. Lalonde, D. McDuff and L. Polterovich, *On the Flux conjectures*, in CRM Proceedings and Lecture Notes, American Mathematical Society, Volume **15** (1998), 69–86.
- F. Lalonde and L. Polterovich, Symplectic diffeomorphisms as isometries of Hofer’s norm, *Topology* **36** (1997), 711–728
- F. Lalonde and D. McDuff, Positive paths in the linear symplectic group, *The Arnold-Gelfand seminar*, Birkhauser, 1997, pp 1–20.
- F. Lalonde, *Energy and capacities in symplectic topology*, in: W. H. Kazez (ed.), Geometric Topology, Studies in Advanced Mathematics, vol. 2, American Mathematical Society and International Press, 1997, 328–374.

- F. Lalonde, *New trends in symplectic geometry*, invited survey in the new series of C.R. Math. Rep. Acad. Sci. Canada, vol. 19 (2), 1997, 33-50.
- F. Lalonde, *J-curves and symplectic invariants*, in: J. Hurtubise and F. Lalonde (eds), Proceedings of the NATO Summer Advanced Institute (SMS) on Gauge Theory and Symplectic Geometry Université de Montréal 1995, Kluwer Academic Publishers, Dordrecht, 1997.
- F. Lalonde and D. McDuff, The classification of ruled symplectic 4-manifolds, *Mathematical Research Letters* **3** (1996), 769–778.
- F. Lalonde and D. McDuff, *J-holomorphic curves and the classification of rational and ruled symplectic 4-manifolds*, in: C.B. Thomas (ed.), Symplectic and Contact Geometry, Proceedings of the Newton Institute Special Year on Symplectic Geometry, Cambridge University Press, 1996, pp 1–40.
- F. Lalonde and D. McDuff, Local Non-Squeezing Theorems and Stability, *Geometric and Functional Analysis* **5** (Special volume in the honor of M. Gromov) (1995), 364 – 386.
- F. Lalonde and D. McDuff, Hofer’s L^∞ -geometry: energy and stability of Hamiltonian flows part I, *Inventiones Mathematicae* **122** (1995), 1 – 34.
- F. Lalonde and D. McDuff, Hofer’s L^∞ -geometry: energy and stability of Hamiltonian flows part II, *Inventiones Mathematicae* **122** (1995), 35 – 69.
- F. Lalonde and D. McDuff, The geometry of symplectic energy, *Annals of Mathematics* **141** (1995), 349 – 371.
- F. Lalonde, Isotopy of symplectic balls, Gromov’s radius, and the structure of irrational ruled symplectic 4-manifolds, *Mathematische Annalen* **300** (1994), 273-296.
- M. Audin, F. Lalonde and L. Polterovich, *Symplectic rigidity: Lagrangian submanifolds*, in: M. Audin and J. Lafontaine (eds.), Holomorphic Curves in Symplectic Geometry, Progress in Mathematics, vol. 117, Birkhauser, 1994, pp. 271-322.
- F. Lalonde, Hamiltonian Collapsing of Irrational Lagrangian Submanifolds with Small First Betti Number, *Communications in Mathematical Physics* **149** (1992), 613-622.
- F. Lalonde, Suppression lagrangienne de points doubles et rigidité symplectique, *Journal of Differential Geometry* **36** (1992), 747-764.
- F. Lalonde et J.-C. Sikorav, Sous-variétés lagrangiennes et lagrangiennes exactes des fibrés cotangents, *Commentarii Mathematici Helvetici* **66** (1991), 18-33.
- F. Lalonde, Classes caractéristiques isotropes, *Mathematische Annalen* **285** (1989), 343–351.
- F. Lalonde, *Quelques invariants topologiques en géométrie symplectique*, in: J.M. Morvan and L. Verstraelen (eds.), Geometry and Topology of Submanifolds, Proceedings of the Meeting at Luminy, May 1987, pp. 149–156, World Scientific 1989.

F. Lalonde, Homologie de Shih d'une submersion (homologies non-singulières des variétés feuilletées) Mémoire SMF (nouvelle série) no. 30, Supplément au *Bulletin de la Société Mathématique de France* **115** (1987), 101 pages.

F. Lalonde, Homologie de Shih: Définition et Propriétés, *Canadian Journal of Mathematics* **38** (1987), 748–768.

F. Lalonde, Homologie de Shih d'une submersion, *C.R. Acad. Sc. Paris* **299** (1984), Série I, 1025–1028.

F. Lalonde, Homologie de plongements dans les variétés différentiables, *C.R. Acad. Sc. Paris* **299** (1984), Série I, 987–990.

F. Lalonde, Homologie de plongements dans les espaces euclidiens, *C.R. Acad. Sc. Paris* **297** (1984), Série I, 659–62.

F. Lalonde, Le problème d'étoiles pour graphes est NP-complet, *Discrete Mathematics* **33** (1981), 271–80.

Books and proceedings

M. Abreu, F. Lalonde, L. Polterovich eds, *New Perspectives and Challenges in Symplectic Field Theory*, The CRM Proceedings and Lecture Notes", vol. 49, American Mathematical Society, 2009, 342 pages.

P. Biran, O. Cornea and F. Lalonde (eds), *Morse theoretical methods in symplectic topology and non-linear analysis*, Proceedings of the NATO Advanced Study Institute (Montreal, 2004), Kluwer Academic Publishers, Dordrecht, 2005.

Y. Eliashberg, B. Khesin and F. Lalonde eds, *Symplectic and Contact Topology: Interactions and Perspectives* (Proceedings of the workshop on "Symplectic topology and higher dimensional Gauge invariants" held at the Fields Institute in March-April 2001), Fields Institute Communications **35**, AMS, 2003.

F. Lalonde (ed.), *Proceedings of the CRM Workshop on Geometry, Topology and Dynamics Montréal 1995*, CRM Proceedings and Lecture Notes **15**, AMS 1998.

J. Hurtubise and F. Lalonde (eds), *Gauge Theory and Symplectic Geometry*, Proceedings of the NATO Summer Advanced Institute on Gauge Theory and Symplectic Geometry (Montréal 1995), Kluwer Academic Publishers, Dordrecht, 1997.

MAIN INVITED LECTURES AND ADDRESSES OVER THE LAST TEN YEARS

The Beverly Sackler Distinguished Lecture Series in Exact Sciences, Tel Aviv University, March 2009.

Invited plenary speaker, European Congress of Symplectic Geometry, Strasbourg, January 2009.

Invited speaker, International Congress of Mathematicians, 2006.

The 2005 Distinguished Lecture Series, Stanford University.

The 2005 Floer Memorial Lecture (Berkeley–Davis–SantaCruz–Stanford).

Series of lectures (given jointly with O. Cornea) at the Institute for Advanced Study, Princeton, October 2005.

Invited plenary speaker, Great Lakes Geometry Conference, Perimeter Institute, March 2005.

Invited plenary address, Annual Meeting of the Canadian Mathematical Society, McGill, 2004.

Plenary speaker, Conference on Symplectic Topology, Stare Jablonki, Poland, July 2004.

Invited speaker, MSRI (Mathematical Sciences Research Institute), Workshop on Symplectic Geometry and Mathematical Physics, March 2004.

Invited talk at the 2004 Clifford Conference on Holomorphic Curves: Algebra, Geometry, and Analysis, Tulane University, March 2004.

Conférence plénière d'ouverture, Congrès annuel de l'Association mathématique du Québec, octobre 2003.

Invited talk, Workshop in Symplectic topology and dynamics, ETH, Zurich, May 2003.

Société mathématique du Canada, Réunion d'hiver 2002, deux conférences: l'une aux spécialistes et l'autre pour les étudiants gradués, décembre 2002.

Conférence invitée au Congrès Topologie symplectique et théorie de Morse, Lille, août 2002.

Conférence invitée au Colloque en l'honneur de V. Schwarzbach, Université Claude Bernard, Lyon, juin 2002.

Suite de trois conférences de recherche, CNRS et Université d'Aix-Marseille, mars 2002.

Conférencier au Colloquium de l'Institut Fourier de Grenoble, février 2002.

Conférencier au Colloquium de l'Université de Paris, octobre 2001.

Conférencier au Colloquium de l'Université Louis-Pasteur, Strasbourg, novembre 2001.

Suite de sept conférences de recherche, Centre mathématique de l'École Polytechnique de Paris (Palaiseau), septembre et octobre 2001.

Invited talk, Workshop on contact and symplectic geometry, Lorentz Center, Leiden, Holland, August 2001.

Series of five lectures, Instituto Superior Tecnico, Lisbon, Portugal, July-August 2001.

Invited talk, Workshop on Hamiltonian dynamics and Non-linear Analysis, Rinberg Castle, Bavaria, June 2000.

Closing plenary address (Canadian side), First Canada-China Mathematical Congress, Beijing, 1999.

ICM 1998: A survey of my joint work with Dusa McDuff was presented in her one-hour plenary address at the International Congress of Mathematicians, Berlin, 1998.

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS.

Supervisor or co-supervisor of postdoctoral fellows:

Samuel Lisi (Ph.D. Stanford 2006), now researcher at Stanford

Ozgun Ceyhan (Ph.D. Strasbourg and Bonn 2006), now researcher at University of Amsterdam

Basak Gurel (Ph.D. UC at Santa Barbara 2006), now professor at Rice University

Shengda Hu (Ph.D. Madison, 2003), now professor at University of Waterloo.

Alexander Ivrii (Ph.D. Stanford, 2003), now at Technion University, Israel.

David Gay (Berkeley, 2003), now professor at the University of Cape Town, South Africa.

Ramin Mohammadalkahani (Ph.D., Toronto, 2002).

Diego Matessi (Ph.D. Warwick, 2001), now professor at Università del Piemonte Orientale

Tadashi Tokieda (Ph.D. Princeton, 1996), now Senior lecturer at the University of Cambridge.

Jennifer Slimowitz (Ph.D. SUNY Stony Brook, 1998), now professor at Rice University.

David Th eret (Doctorat Paris, 1996), now teaching at Universit e de Montpellier (France)

Maia Fraser (Ph.D. Stanford, 1994), now working in a finance company in Zurich.

Seguei Makar-Limanov (Ph.D. Stanford, 1994), now working in a New York firm in finance.

Jacques Rioux (Ph.D. Cornell, 1986, co-supervision and financial support), now associate professor at Université Laval

Supervisor of Ph.D. and M.Sc. theses:

François Charest, currently at the Ph.D. under my supervision.

Samira Lashhab, currently at the Ph.D. under my supervision.

Laurence Boulanger, currently at the Ph.D. under my supervision.

Anthony Rieser, currently at the Ph.D. under joint supervision with O. Cornea.

Clément Hyvrier, Ph. D. 2008, now maître de conférence at Université de Montpellier, France

Anik Soulière, Ph. D. 2006 (joint supervision with T. Tokieda), now professor at College Jean de Brébeuf

Martin Pinsonnault, Ph.D. 2002, now professor at the University of Western Ontario.

Charles Pestieau, Ph.D. 1998, now working for a British company specialised in the mod-
elisation of physics laws

Daniel Gatién, Ph.D. 1996, postdoctoral fellow at McMaster and now professor at John
Abbott College

Esteban Herrera, currently at the M.Sc. under my supervision.

Martin Frankland (Governor general's Medal awarded for the best academic results at the
bachelor level at University of Montreal), M.Sc. 2006, now student at MIT

Pierre-Paul Delisle, M.Sc. 2002, now consultant for Motorola, Montreal.

Frédéric Rochon, M.Sc. 2001, now scholar at University of Toronto (Recipient of one of the
six 2002 Fellowships Julie-Payette awarded by NSERC in Canada; awarded the 3rd prize
in the 1999 national competition of the Canadian Association of physicists; nominated by
MIT for a Clay fellowship).

Benoit Charbonneau M.Sc. 1999 (co-supervision), (M.Sc. Thesis Prize, ACFAS, 1999)
now lecturer at Duke University.

Martin Pinsonnault, M.Sc. 1996, see above

Daniel Bussièrès, M.Sc. 1996, now in computer sciences

Bernard Kamté, M.Sc. 1996 (joint supervision with R. Sharpe, U of T), now at the INRS-
Communications

Charles Pestieau, M.Sc. 1993, see above

Daniel Gatién, M.Sc. 1992, (Governor general's Medal awarded for the best academic results at the bachelor level at Concordia University), see above

Michel Milot, M.Sc. 1992, now professor at John Abbott College

André Lebel, M.Sc. 1990, Ph.D. at Warwick, postdoc at McGill and now professor at St-Lawrence College (Governor general's Gold Medal awarded for his master under my supervision)

Simon Richard, M.Sc. 1989, Ph.D. at SUNY, Stony Brook, 1990-96, now working on the executive board of a New York based gas company

Patrice Castonguay, M.Sc. 1988, now professor at Collège André-Laurendeau.

ADMINISTRATION, COMMITTEES AND HONOURS

Director, Centre de Recherches Mathématiques, 2004-2008. The director of the CRM is both the director of the scientific program and the administrative director. A few hundreds workshops, congresses and summer schools were organized under my mandate. Eight laboratories with 200 researchers are under the umbrella of the CRM. The annual reports during my mandate are available at <http://www.math.crm.ca>.

Fellow of the Royal Society of Canada (Academy of Sciences), since 1997.

Fellow of the Fields Institute, since 2001 when this honour was introduced.

Member, editorial committees of: Canadian Journal of Mathematics (1999-2005), Canadian Bulletin of Mathematics (1999-2005), Comptes rendus of the Academy of Sciences of Canada (1997-), Treatises in Mathematics edited by AKPeters (2005-), CRM-AMS Monographs series (2004-), CRM-AMS Proceedings series (2004-), CRM-Springer series in Mathematical physics (2004-).

Member of the Committee in charge of evaluating IRMA, Strasbourg, the first CNRS laboratory in France, for the ANR (Agence Nationale de la Recherche, France), 2008.

Co-founder, with Gilles Brassard (CS, Montreal) and Michael Hilke (Physics, McGill) of the Institute in Quantum informatics INTRIQ, Canada, 2006.

Member of the Scientific committee of the Banff Research Station (BIRS), 2004 – 2006.

Member of the Scientific Advisory Committees of both the Fields Institute (Toronto) 1998-2002 and the Centre de Recherches Mathématiques (Montréal) 1996-2001 and 2004-2008.

Member of the Advisory Committee of AARMS (Atlantic Association for Research in the Mathematical Sciences), since the foundation of this committee in 2001.

Scientific director, Séminaire de Mathématiques Supérieures, the only NATO Advanced Scientific Institute held every year, 2002-2008.

Killam Fellow, 2001–2003.

Member of the Synge Committee, Royal Society, 1998–2003.

Founder of CIRGET (Centre Interuniversitaire de recherche en géométrie différentielle et topologie) in 1997, director until 2001 and member since its foundation. CIRGET is one of the main research groups in mathematics in Canada: its membership includes 15 professors in four universities, about 40 graduate students and a dozen postdoctoral fellows. The Center is directly responsible for the organisation and funding of a large spectrum of activities (seminars, workshops, postdoctoral program, relations with students at all levels). See <http://www.cirget.uqam.ca>

Holder, Canada Research Chair in Symplectic topology, 2001-

Director, Institut des Sciences Mathématiques (Concordia, Laval, McGill, Montréal, Sherbrooke and UQAM), 1996-2000. During that mandate, Laval and Sherbrooke joined the ISM as full members; the postdoctoral programme and the Colloquium of Montreal were set up. We created the Colloque pan-québécois des étudiants avancés. With the help of the coordinator, we set up the Carl Herz Foundation, the Carl Herz doctoral Prize, initiated a full program of relations between the universities and the colleges. The annual reports during my mandate are available at <http://www.math.uqam.ca/ISM/>.

Chair of the NSERC Grants Selection Committee in pure and applied mathematics (GSC 336), 1997-98.

Member of the Bureau de direction, Centre de Recherches Mathématiques (Montréal) 1991-1995.

Member of NSERC's Steering Committee in charge of submitting the Reallocation document for mathematics in Canada for the period 1999-2003. As chair of the Grant selection committee 336, I was member ex officio of this committee which succeeded in substantially improving the situation of mathematics in Canada for the first time.

Member of NSERC's Selection Committee "University Research Fellows", 1988-1992.

Member of NSERC's Selection Committee "Women Faculty Awards", 1991-1992.

Member of NSERC's Selection Committee "Research Grants GSC 336", 1995-98.

Member of the Advisory and Liaison Committees with NSERC, 1996-98.

In charge, with Don Dawson and Ed Perkins, of the application for the NNRMS (National Network for Research in the Mathematical Sciences), 1998.

Member of the FCAR Selection Committee "Equipes FCAR", 1992-93.

Member of the Steering Committee, Institut des Sciences mathématiques, since its foundation in 1991 to 2000.

ORGANIZATION OF WORKSHOPS, CONGRESSES, SUMMER SCHOOLS

a very brief summary that excludes the events organized under my mandate at CRM as well as the NATO Scientific Conferences (Séminaire de Mathématiques Supérieures) organized under my supervision during the years 2004–2010

In charge of the organization of the CRM Thematic programme for the year 2012-2013 on Moduli spaces in Geometry.

Co-organiser of the Conference in the Honour of Raoul Bott, June 2008.

Organiser (with Ralph Cohen (Stanford), Alexander Givental (Berkeley), Leonid Polterovich (Tel Aviv), Rick Schoen (Stanford)) of the Conference “Challenges and Perspectives in Symplectic Field Theory” in the honour of Yakov Eliashberg, Stanford, June 2007.

Organiser, with O. Cornea (MTL), H. Hofer (IAS) and K. Wehrheim (MIT) of the Workshop “Clusters Meet Polyfolds” on the relations between the Cornea-Lalonde Cluster complex and the Hofer-Wysocki-Zehnder polyfold theory, Institute for Advanced Study, Princeton, October 2005.

Organizer, with D. Auroux (MIT), of the Session in Symplectic Geometry at the First Canada-France Congress, Toulouse, 2004.

Member of the scientific committee, First Canada-France Congress in the Mathematical Sciences, Toulouse, July 2004.

Organizer, with Octav Cornea and Paul Biran, of the NATO ASI on Morse theoretic methods in Non-linear Analysis and Symplectic Topology, Montreal, June and July 2004.

Co-organizer, Journées Joyal, Colloque en l'honneur d'André Joyal, UQAM, april 2003.

Organizer, with Khesin, Jeffrey, Meinrenken and an international committee of the Fields-CRM six-month thematic program in Symplectic Topology and Gauge Theory, Montreal and Toronto, January 2001 to June 2001.

Organizer with Boyer, Hurtubise and Kamran of the CRM thematic year in Geometry and Topology, 1995.

Organizer with Hurtubise of the NATO Advanced Study Institute on Gauge Theory and Symplectic Geometry, 1995.

Member of the overall scientific committee, ACFAS annual meeting, UQAM, 1994.