Octav Cornea: Curriculum Vitae [1]

Date and place of birth: July 15th, 1966, Bucharest, Romania
Canadian Citizen

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Positions held:

2021 - current. Director *Centre de recherches mathématiques.*

2015 - 2016. Member, *Institute for Advanced Study, Princeton.*

2011 - 2014. Deputy Director, *Centre de recherches mathématiques.*

2010 - 2019. Director, *Séminaire de Mathématiques Supérieures.*

2009 (Fall). Research Professor, *Mathematical Sciences Research Institute, Berkeley.*

2006 - 2009. Director, *Institut de Sciences Mathématiques de Montréal.*

2003 - current. Professor, Université de Montréal.

2000 - 2001. Member of the CNRS (délégation).

1994 - 2003. Professeur des Universités, Lille 1, France.

1993 - 1994. Postdoctoral fellow, University of Toronto.

1990 - 1993. Teaching Assistant, University of Rochester.

Educational background:

Ph.D. - University of Rochester 1993, advisor Joseph Neisendorfer.

M.A . - University of Rochester 1992.

B.A. - University of Bucharest 1990.

Research interests:

Symplectic, algebraic and differential topology.

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[1]Date: May 2022

Distinctions and prestigious invitations

- Member, *Institute for Advanced Study*, (2015-2016).

- Simons Fellow (2015-2016).

- Invited Speaker: *Mathematical Congress of the Americas*, August 2013.

- Invited Speaker: *D-Days, A panorama of Geometry*, ETH, June 2013.

- Research Professor MSRI. Fall 2009.

- Plenary Speaker *AMS - sectional meeting*, April 2009.

- Invited plenary speaker (joint with P. Biran), *Yashafest*, June 2007.

Students and post-doctoral fellows.

Post-doctoral fellows:

- Yusuke Kawamoto (2021-2022, co-supervision)

- Vukasin Stojaslevich (2021-2022, co-supervision)

- Vardan Oganesyan (2020 - 2021, co-supervision)

- Jun Zhang (2019 -2021, co-supervision)

- Dimitry Faifman (2018-2020, co-supervision)

- Noemie Legout (2018, co-supervision)

- Sarah Tukachinsky (2016-2017, co-supervision)

- Weivei Wu (2014-2016, co-supervision)

- Luis Haug (2014-2016, co-supervision)

- Michael Brandenbursky (2013-2015, co-supervision)

- Egor Shelukhin (2012-2015, co-supervision)

- Yasha Savelyev (2011-2013, co-supervision)

- Roman Golovko (2010-2012, co-supervision)

- Nicolai Dimitrov (2009-2010, co-supervision)

- Martin Pinsonneault (2007-2008, co-supervision)

- Shengda Hu (2007-2008, co-supervision)

- Ozgur Ceyhan (2006-2008, co-supervision)

- Basak Gurel (2006-2008, co-supervision)

- Samuel Lisi (2005-2007, co-supervision)

- Alex Ivrii (2003-2004, co-supervision)

Doctoral students:

- John Miller (January 2021- , co-supervision)

- Filip Brocic (January 2020 - , co-supervision)

- Dominique Rathel-Fourrier (September 2019 -)

- Jean-Philippe Chassé (September 2018 -)

- Alexandre Perrier (2019)

- Emily Campling (2019)

- Vincent Letourneau (April 2020, co-supervision).

- Lara-Simone Suarez Lopez (2014).

- François Charest (2012, co-supervision).

- François Charette (2012).

- Anthony Rieser (2010).

- Fabien Ngo (2010, co-supervision).

- Rémi Leclercq (2007).

- Pierre-Marie Moyaux (2001).

Master/DEA students:

- Paul Fontaine (2020).

- Audrey Morin (2017).

- Florian Duquerroix (2014).

- Vincent Letourneau (2014).

- Tuan Nguyen (2013, co-supervision).

- Alexandre St.Pierre (2009).

- François Charette (2007).

- Olivier Rousseau (2005).

- François Rose (1997).

- Benoit Trouillet (1997).

- Pierre-Marie Moyaux (1996).

- Stephane Zamparo (1996).

Fellows:

- Louis-Simon Cyr (Summer 2022).

- Julien Hébert-Dutreloux (Summer 2021).

- Luis Carlos Sodevila (Summer 2021).

- Ludovic D'Anjour-Madore (Summer 2020).

- Mathieu Pinneault (Summer 2020).

- Laurent Alcene-Racicot (Summer 2019).

- Simon-Olivier Savard (Summer 2018).

- Samuel DesRoches (Summer 2018).

- Philippe Robitaille-Grou (Summer 2017).

- Alexis Leroux-Lapierre (Summer 2016).

- Stephanie Larocque (Summer 2015).

- Francois Simon Fauteux-Chapleau (Summer 2014 and 2015).

- Alexandre Perrier (ENS - stage Master 2, Spring 2014).

- Vincent Girard (Summer 2014).

- Jean Lagacé (Summer 2013).

- Audrey Morin (Summer 2103).

- Vincent Letourneau (Summer 2012).

- Audrey Morin (Summer 2012).

- Jean-François Viens (Summer 2011 and 2012).

- Jean-François Gagnon (Summer 2009).

- Esteban Herrera (Summer 2008).

- Loic Seguin-Charbonneau (Summer 2007).

- Pierre Pageault (Stage - ENS; Summer 2006).

- Katja Hutschenreuter (Summer 2005).

- François Charette (Summer 2005).

- Daniel Fiorilli (Summer 2005).

Scientific committees and boards.

- Editor for Canadian Journal of Mathematics (2022 -).

- Editor for International Journal of Mathematics (2022 -).

- Editor for Annales Mathématiques du Québec (2009 - 2017 and from 2020 on).

- Associate editor for the Journal of Fixed Point Theory and Applications (Birkhauser) (editor 2007–2010, associate editor since 2010).

- Fields Institute board (member, 2019-2021).

- Editor in Chief of the Annales Mathématiques du Québec (2017 -2020).

- Local scientific board of the CRM (2014 - 2018).

- Nominating Commitee of the Canadian Mathematical Society (2011 - 2014).

- NSERC Discovery Grant Evaluation Group 1508 (maths - stats, 2009-2012).

- NSF Panel on geometric analysis and symplectic geometry, 2010.

- Banff International Research Station, Scientific Advisory Board (2005-2007).

- Canada Research Chairs Program College of Reviewers (since 2005).

- Board of directors of the Canadian Mathematical Society (2007-2011).

- European Research Council Experts Board - external member (2009-2013).

Grants.

Individual grants:

- UMI-CNRS-CRM - grant, 22000$, 2020-2021.

- NSERC - individual Discovery grant, 41000$/year, 2018-2023.

- NSERC - individual Discovery grant, 44000$/year, 2013-2018.

- Simons Foundation, 126000$, 2015-2016.

- Institute for Advanced Study, 25000$, 2015-2016.

- NSERC - individual grant, 25000$/year, 2008-2013.

- NSERC - individual grant, 18000$/year, 2003-2008.

- NATO- Advanced Science Inst. -grant, 2004, 42000 euros.

- 1996-2002 recipient of "Prime de recherche et encadrement doctoral"(France).

Group grants:

- Simons Foundation, Isntitute Support Grant (Luc Vinet principal applicant), 200000$/year, 2017-2022.

- FRQ-NT - research team grant (Francois Lalonde principal applicant), 41000$/year, 2013-2016.

- NSERC - Banff International Research Station support grant (Nassif Ghoussoub - principal applicant), 636000\$/year, 2011-2016.

- FQRNT - group grant (with François Lalonde), 47000\$/year, 2010 -2013.

- FQRNT - group grant (with Francois Lalonde). 48000\$/year, 2007-2010.

- FQRNT - group grant (coordinator Steven Boyer), 40000\$/year, 2003-2006.

- NSERC - Leadership Science Initiative - group grant (coordinator Steven Boyer), 42000\$/year, 2003-2006

Organization of scientific events.

- Metric structures in symplectic and contact topology, Mittag-Lefler Institute, June 2022 (co-organizer).

- Symplectic Zoominar, co-organized with the IAS, ENS, and Tel Aviv University, from March 2020.

- Current trends in Symplectic Topology, Séminaire de Mathématiques Supérieures, CRM-Montreal, July 2019, (co-organizer).

- Summer school on symplectic topology, CIRM - Marseille, September 2015, (co-organizer).

- Symplectic Topology conference, CRM - Montreal, August 2015, (co-organizer).

- Special session on symplectic geometry, the Mathematical Congress of the Americas, Mexico, August 2013, (co-organizer).

- Conference on non-linear analysis and applications, the Banach Center, Poland, July 2013 (scientific committee member).

- J-holomorphic curves in symplectic geometry and topology, CRM, April -May, 2013 (co-organizer).

- Scientific co-director for the Canada - France joint mathematical meeting, Montreal, 2008.

- "Floer methods in dynamics", CRM, 2008, (co-organizer).

- "Floer theory" meeting at BIRS, 2007, (co-organizer).

- Mini-conference of homotopy theory, CRM, November 18-20, 2005.

- Workshop on "Cluster-Polyfold theory" at the Institute for Advanced Study, October 2005, (co-organizer).

- CRM - ISM Colloquium in 2004-2005 (co-organizer) .

- Symplectic informal semester at the CRM, Fall 2004, (co-organizer).

- Nato Advanced Study Institute - "Morse Theoretical Methods in Symplectic Topology and Non-linear Analysis " - june, 2004, (scientific co-director).

- Colloquium in Lille, Spring 2002.

- Conference on Symplectic Topology in Lille, June 2002, (co-organizer)

- Workshop on the Conley index , Sherbrooke, Quebec, August 2001, (co-organizer).

- AMS-SIAM Summer Research Conference on the Lusternik-Schnirelmann category and its applications, Mt. Holyoke, US, August 2001, (co-organizer).

- "Journées de théorie de l'homotopie" 12-18 January 1997 at the Centre International de Rencontres Mathematiques (CIRM) in Luminy, France, (co-organizer).

- Mini-conference on the Conley index" at the University of Lille in March 1996.

- Annual series of lectures on "Homotopy theory and applications" from 1995 to 2000 at the University of Lille 1.

Long term scientific visits .

- FIM-ETH, Zürich - two weeks May 2018.

- Research in Pairs Program, Oberwolfach, two weeks in May 2017.

- Simons Center, Stony Brook - three weeks in the Spring of 2014.

- Professeur invité - Université Paul Sabatier Toulouse - June 2013.

- IAS, Princeton, USA - two weeks March 2012.

- ETH, Mathematics Department, Zürich - two weeks July 2011.

- Professeur invité - Université Paul Sabatier de Toulouse - May 2010.

- ETH, Mathematics Department, Zürich - two weeks in January 2010.

- MSRI, Fall 2009.

- Tel Aviv University, two weeks in June 2009.

- ETH Mathematics Department, Zürich - December 2007.

- Department of Mathematics, Tel Aviv University - April 2005.

- Pisa, Centro di Giorgi - February 2005.

- Courant Inst. NY - April 2001.

- Fields Institute, Toronto - Symplectic semester, March 2001.

- University of Campinas, November 2001.

- Research in Pairs Program, Oberwolfach July 1999.

- Centre de Recerca Matematica, Barcelona - the homotopy semester, Spring 1998.

- The Fields Institute, Toronto -the homotopy year, 1996.

- Université de Lille 1, May 1994.

Selected invited talks .

- IHP - Symplectic Seminar, June 2021.

- London Symplectic Topology seminar, July 2020.

- Symplectic dynamics conference, Lausanne, August 2019.

- Symplectic Topology seminar talk, ETH, November 2018.

- Topological Data Analysis meets Symplectic Topology, Tel Aviv University, April 29 - May 3, 2018.

- Workshop on Immersed Lagrangian Cobordisms, April 6 - 9, 2018, University of Ottawa.

- Special session on Symplectic Geometry, PRIMA, Guanajuato, Mexico, August 2017.

- Workshop on symplectic and contact topology, Montreal, May 2016.

- Conference on symplectic topology and dynamics, Madrid, May 2016.

- Seminar talk, MIT, April 2016.

- Seminar talk, Stanford, April 2016.

- IAS/Princeton University symplectic topology seminar, September 2015.

- PIMS Symposium on Geometry and Topology, Vancouver, June 2015 (plenary speaker).

- Moduli spaces in symplectic topology and gauge theory, CIRM, Marseille, June 2015.

- Loop spaces and symplectic topology, Nantes, September 2014.

- Technical aspects in moduli spaces 2nd worksop, Simons Center for Mathematics and Physics, June 2014.

- Symplectic topology and Dynamical systems, Madrid, November 2013.

- Summer school on Symplectic Topology in Llagone, June 2013 - principal speaker.

- Holomorphic curves in low-dimensional and symplectic topology, Stanford, August 2012.

- Oberwolfach meeting on Dyanmics and symplectic Topology, july 2012.

- Haifa conference on symplectic topology, June 2012.

- CIRM - Marseille conference on Algebraic Topology, June 2012.

- Ottawa conference on algebraic topology, may 2012.

- Seminar talk, Chicago University, December 2011.

- Colloqium, Waterloo University, September 2011.

- Dynamical Systems, Campinas, Brazil, May 2011 - plenary speaker.

- Geometry and Physiscs Conference, Fields Inst., May 2011.

- Symplectic Topology Workshop, Kyoto, February 2011.

- Geometric group theory, dynamics and symplectic topology, Oberwolfach, July 2010.

- Geometry Seminar, Toulouse, May 2010.

- Puzzles in symplectic geometry and topology, MSRI Berkeley, March 2010.

- Introductory workshop to the Symplectic Program, MSRI Berkeley, August 2009.

- CMS Summer meeting in St. John's, NF (sectional speaker), June 2009.

- Florida Topology Conference, March 2009 - semi-plenary invited speaker.

- Geometric group theory, dynamics and symplectic topology, Oberwolfach, September 2008.

- Indiana Symplectic Topology conference, Indiannapolis, February 2008.

- Math-Physics conference, ETH, September 2007.

- Geometric group theory, dynamics and symplectic topology, Oberwolfach, July 2006.

- Computational and topological aspects of dynamics", Lorenz Center the Netherlands, May 2006.

- BIRS symplectic topology, December 2005.

- Conference on topology of manifolds, Siegen, July 2005.

- Colloquium, Technion, April 2005.

- Colloquium, Bar Ilan University, April 2005.

- Distinguished Topology lectures, Tel Aviv University, April, 2005.

- Mini-course on symplectic topology, Ecuola Normale Sup.-Pisa, February 2005.

- NATO summer school, Montreal, July 2004.

- Meeting of the CMS - SMF - Toulouse, July 2004.

- AMS sectional meeting in Los-Angeles, April 2004.

- Colloquium University of Florida Gainsville, March 2004.

- AMS sectional meeting in Binghamton, October 2003.

- Non-linear analysis meeting in Bedlevo, Poland, June2003.

- Canadian Math. Soc. meeting in Edmonton, June 2003.

- Colloquium, Dartmouth University, avril 2003.

- NYU-SUNY, Sympplectic topology seminar, février 2003.

- Leipzig - Mini-course "Topology for the non-linear analyst", November 2002

- Louvain-la-Neuve - Mini-course on "Morse theory"

- Oberwolfach, Topology conference, September 2001

- Barcelona Euro-PhD conference, Barcelona, July 2001

- Skye Algebraic Topology conference, Skye, June 2001

- Non-linear analysis, Banach Inst., Poland, June 2001

- Fields-CRM Symplectic Topology workshop, April 2001

- Algebraic topology meeting in Strasbourg, September 2000

- Algebraic topology worshop in Haifa, June 2000

- The AMS regional meeting in Charlotte (special session on Dynamical Systems), October 1999.

- Algebraic Topology, Paris, September 1999.

- 2nd International Conference on Topological Methods in non-linear Analysis, Guernavaca, Mexico, February 1999.

- Algebraic Topology, Angers, September 1998.

- Aarhus Topology and Geometry Conference, Aarhus, August 1998.

- Barcelona Algebraic Topology Conference, Barcelona, June 1998.

- Conference on the Conley index at the Banach center, Warsaw, June 1997.

- Conference on the LS-category at the Banach center, Warsaw, June 1997.

- The AMS regional meeting in Detroit, May 1997.

- Northwestern Homotopy Conference, Evanston, March 1997.

- Homotopy miniconfernce; Matagne la Petite, November 1996.

- The homotopy year at the Fields Institute; Toronto, May 1996 .

- Algebraic Topology Miniconference; Paris Nord, December 1995.

- AMS regional meeting at Kent State University; November 3-4, 1995.

- Topology; Oberwolfach, September 3-9, 1995.

- Modern trends in homotopy theory: Oxford, Spring 1995.

- Rational Homotopy Summer School at Breil sur Roya, France; May 24 - June 4, 1994.

- Ontario Topology conference, Toronto 1993.

- AMS conference Trent University, October 1993.

- Algebraic topology miniconference; Malaga, Spain, October 1993

- The AMS regional meeting in Syracuse, September 1993.

- The Cech Centennial Homotopy Conference; Northeastern University, June 1993.

- Algebraic Homotopy; Schloss Ringberg, Germany, April 1993.

- Ontario Topology conference; University of Rochester, April 1992.

Teaching.

I taught at all levels: calculus, complex analysis, general topology, algebraic topology, differential geometry and a variety of specialized advanced courses - Morse theory, Lagrangian topology etc.

Administration.

- Director of the *Centre de Recherche Mathématiques* from July 1st, 2021.
  (http://www.crm.umontreal.ca/en/index.shtml).

- From 2010 to 2019 I was director of the *Séminaire de Mathématiques Supérieures*
  (http://www.dms.umontreal.ca/ sms/).

- Deputy director of the *Centre de Recherche Mathématiques* from 2011 to 2014.

- Director of the *Institut de Sciences Mathématiques de Montréal*
  (http://www.math.uqam.ca/ism/) from 2006 to 2009.

Publication list.

Refereed papers, published or accepted:

36. with Paul Biran, Bounds on the Lagrangian spectral metric in cotangent bundles, *Comm. Math. Helv.*, 96 (2021), 631–691.

35. with Paul Biran, A Lagrangian Pictionary, *Kyoto Math. J.,* (invited contribution for a volume in honour of K. Fukaya) 61 (2021), 399–493.

34. with P. Biran and E. Shelukhin, Lagrangian shadows and triangulated categories, *Astérisque*, 426 (2021) 128 pages.

33. with Egor Shelukhin, Lagrangian cobordism and metric invariants, *Journal of Differential Geometry*, 112 (2019) 1–45.

32. with Paul Biran, Lagrangian cobordisms in Lefschetz fibrations, *Selecta Mathematica*, 23 (2017), 2635–2704.

31. with François Charette, Categorification of Seidel's representation, *Israel J. of Mathematics* 211 (2016), 67–104.

30. Lagrangian cobordism: Rigidity and Flexibility Aspects, *Mathematical Congress of the Americas, Contemp. Math.* 656, Amer. Math. Soc., Providence, RI, (2016), 41–63.

29. with Paul Biran, Lagrangian Cobordism and Fukaya categories, *GAFA* 24 (2014), 1731–1830.

28. with Paul Biran, Lagrangian cobordism, *Journal of the A. M. S.*, 26 (2013), 295–340.

27. with Paul Biran, Enumerative geometry and Lagrangian topology, *Geometry and Topology*, 16 (2012), 963-1052.

26. with K. A. de Rezende, M.R. da Silveira - Spectral sequences in Conley's theory, *Ergod. Th. & Dynam. Sys.* (2010), 30, 1009–1054

25. with P. Biran - Rigidity and uniruling for Lagrangian manifolds, *Geometry and Topology* 13 (2009), 2881–2989.

24. with P. Biran - A Lagrangian Quantum Homology, *New Perspectives and Challenges in Symplectic Field Theory*, CRM Proceedings and Lecture Notes, 49 (2009), 1–44.

23. with Jean-François Barraud, Quantization of the Serre Spectral Sequence, *Journal of Symplectic Geometry*, 5 (2007), 249–280.

22. with Jean-François Barraud, Lagrangian intersections and the Serre spectral sequence, *Annals of Mathematics* 166 (2007), 657-722.

21. with François Lalonde, Cluster homology: an overview of the construction and results, *ERA AMS,12 (2006), 1-12.*

20. with Jean-François Barraud, Homotopical Dynamics in Symplectic Topology, in *Morse theoretical Methods in Non-Linear Analysis and Symplectic Topology*, Springer (2006) 109-148.

19. New obstuctions to the thickening of *CW* complexes, *Proceedings of the American Mathematical Society* 132 (2004), 2769-2781.

18. with A. Ranicki - Rigidity and glueing for the Morse and Novikov complexes, *Journal of the European Mathematical Society,* 5 (2003), 343-394.

17. Homotopical Dynamics II: Hopf invariants, smoothings and the Morse complex, *Ann. Scient. Ec. Norm. Sup.* 35 (2002) 549–573

16. Homotopical Dynamics IV: Hopf invariants and Hamiltonian flows, *Communications on Pure and Applied Math.* 55 (2002), 1033–1088.

15. Homotopical Dynamics III: Real singularities and Hamiltonian flows, *Duke Mathematical Journal* 109 (2001) 183–204 .

14. Homotopical Dynamics: Suspension and Duality, *Ergodic Th. & Dyn. Systems* 20 - 2 (2000) 379–391.

13. avec Y.Felix et J.M.Lemaire - Rational Category and Cone-length of Poincaré Complexes, *Topology* 37 (1998) 743-748.

12. Cone-decompositions and degenerate critical points, *Proc. of the London Math. Soc.* 77 (1998) 437-461.

11. Spanier-Whitehead duality and critical points, Homotopy Theory via Algebraic Geometry and Group Representations, *AMS Contemp. Math.* 220 (1998) 47-63.

10. Some properties of relative L.S.-category, *Fields Inst. Commun.* 19, AMS (1998) 67-72.

9. Homotopical dynamics of gradient flows, Homotopy and Geometry, *Banach Center Publications*, 45 (1998), 41-46.

8. Strong L.S.-category equals cone-length, *Topology* 34 (1995) 377-381.

7. Lusternik-Schnirelmann categorical sections, *Ann.Scient.Ec.Norm.Sup.* 28 (1995) 689-704.

6. There is Just One Rational Cone-length, *Transactions of the A.M.S.* 4 (1994).

5. Cone-length and Lusternik-Schnirelmann category,*Topology* 33 (1994) 95-111.

4. The Genus and the Fundamental Group of High Dimensional Manifolds, *Stud.Cerc.Mat.* 4(1989).

3. Unele proprietati de separare ale hipersuprafetelor, *Stud.Cerc.Mat.* 4(1988).

2. Weak Discontinuities and Discrete Approximations, *An.Univ.Buch.* 3(1988).

1. Proprietati comune functiilor inchise si celor cu proprietatea lui Darboux, *Stud.Cerc.Mat.* 1(1987).

Books:

A. Morse Theoretic Methods in Nonlinear Analysis and in Symplectic Topology Proceedings of the NATO Advanced Study Institute, NATO Science Series II: Mathematics, Physics and Chemistry, Vol. 217 Springer, 2006 (editor with Paul Biran and François Lalonde).

B. "Lusternik-Schnirelmann category" (with John Oprea, Greg Lupton and Daniel Tanré) 320 pages, AMS Surveys and Monographs Series 2003.

C. "Lusternik-Schnirelmann category in the new Millenium" (editor with John Oprea, Greg Lupton and Daniel Tanré) AMS Contemporary Math. 316 - 2002.

Preprints:

i.3 with Paul Biran and Jun Zhang, Triangulation and Persistence: Algebra 101, preprint 2021, arXiv:2104.12258, 92 pages.

i.2. with Paul Biran, Quantum structures for monotone Lagrangians, preprint 2007, arXiv:0708.4221v1, 193 pages.

i.1. with François Lalonde, Cluster Homology, preprint September 2005, arXiv:math/0508345, 57 pages.

Non-refereed publications:

ii.5 Geometrizing the Fukaya Category via Lagrangian Cobordism and Immersions, Report of an *Oberwolfach Research in pairs* program (2017).

ii.4. Towards categorification of Lagrangian topology, *Oberwolfach Reports*, 9 (2012).

ii.3. Lagrangian submanifolds: their fundamental group and Lagrangian cobordism, *Oberwolfach Reports*, 7 (2010).

ii.2. Rigidity of Lagrangian Submanifolds, *Oberwolfach Reports*, 5 (2008).

ii.1. Towards quantization of the Morse complex, *Oberwolfach Reports*, 3 (2006).