

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.

¹Date: July 2021

Distinctions and prestigious invitations

- CARMIN senior researcher, *Institut des Hautes Etudes Scientifiques*, (postponed, Spring 2021).
- 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:

- Vukasin Sojaslevich (2021-2022, co-supervision)
- Vardan Oganessian (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:

- 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.

- Fields Institute board (member, 2019-2021).
- Editor in Chief of the Annales Mathématiques du Québec (2017 -2020).
- Editor of the Journal of Fixed Point Theory and Applications (Birkhauser) (2007–2010, associate editor since 2010).
- Associate Editor of the Annales Mathématiques du Québec (2009 - 2017 and from 2020 on).

- Local scientific board of the CRM (2014 - 2018).
- Nominating Committee 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, Institute 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.

- 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 Mathématiques (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 Semainr, 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.
- Colloquium, 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 miniconference; 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:

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, *GAFSA* 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 obstructions 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.4 with Paul Biran and Jun Zhang, Triangulation and Persistence: Algebra 101, preprint 2021, arXiv:2104.12258, 92 pages.
- i.3. with Paul Biran, Bounds on the Lagrangian spectral metric in cotangent bundles, preprint 2020, arXiv:2008.04756, 49 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).