

Frédéric ROBERT

May 2023

Born February 23rd 1974 in Paris, France
Citizenship : French
Married, two children (2011, 2013)

Curriculum Vitae

Address :

Université de Lorraine
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Positions held :

1994-1999 : École Normale Supérieure de Cachan
1999-2002 : Assistant Moniteur Normalien, Université de Cergy-Pontoise
2002-2003 : Assistant, ETH Zürich
2003-2009 : Maître de Conférences (Associate Professor), Université de Nice-Sophia Antipolis.
2009- : Professeur des Universités (Full Professor), Université de Lorraine.
2013-2014 : On leave in Pacific Institute of Mathematical Sciences (PIMS), University of British Columbia, supported by the French CNRS ("Délégation")
2014 : Promotion to First Class Professor.
2021 : Promotion to Exceptional Class Professor (CNU).

Ph.d. thesis :

Title : "Études asymptotiques d'équations elliptiques issues de la géométrie".
Advisor : Emmanuel Hebey. Defended : November 2001.
Ph.D. Committee : Henri Berestycki (Paris), Emmanuel Hebey (Cergy-Pontoise), Frédéric Hélein (ENS Cachan), Patrice le Calvez (Paris), Lambertus Peletier (Leiden), Eric Séré (Paris), Michel Vaugon (Paris).
Mention : très honorable avec les félicitations du jury.

"Habilitation à diriger des recherches" :

Title : "Analyse variationnelle et phénomènes non-linéaires pour des équations elliptiques critiques". Defended : June 28th 2007 at Nice.
Committee : Philippe Delanoë (Nice), Nassif Ghoussoub (Vancouver), Emmanuel Hebey (Cergy-Pontoise), Gilles Lebeau (Nice), Frank Pacard (Paris 12), Tristan Rivière (Zürich), Michaël Struwe (Zürich), Gabriella Tarantello (Rome 2).

1. Collective Professional contributions

Research responsibilities :

2004-2013 : Hiring committees for French professors and associate-professor positions.
2004-2009 : Math department committee, Université de Nice-Sophia Antipolis.
2009-2013 : "Sector" board (subsection of the faculty of science), U. of Nancy.

2011 : Hiring Committee (president) in Physics, Université de Lorraine.
 2013-2017 : Math department committee, Université de Lorraine.
 2013-2017 : Advisory Board, "Fédération Charles Hermite", Université de Lorraine.
 2016 : Hiring Committee (president) in Mathematics, Université de Lorraine.
 2017-2022 : Scientific pole board, Université de Lorraine.
 2017- : Mathematics PhD Board (president), Université de Lorraine.
 2017- : Faculty PhD Board, Université de Lorraine.
 03/2018 : Scientific Committee, meeting "Young PDEsts", Nancy (France).
 2019 : Hiring Committee in Mathematics, Université de Lorraine.
 2021 : Hiring Committee in Mathematics, Université de Lorraine.

Pedagogic responsibilities :

2010-2012 : Chairman of the Master programme in Mathematics (Nancy).

Organization of conferences :

11/2005 : "Week-end niçois d'analyse géométrique conforme", Nice (France).
 08/2006 : "Geometric and Nonlinear Analysis", Banff (Canada).
 06/2007 : "Geometric Analysis in Nice", Nice (France).
 03/2008 : Scientific day "Analyse non-linéaire et phénomènes critiques",
 Cergy-Pontoise (France).
 06/2011 : "Geometric and Nonlinear Analysis : Meeting in Lorraine", Nancy (France).
 08/2012 : "Recent Trends in Geometric and Nonlinear Analysis", Banff (Canada).
 12/2012 : Scientific day "Géométrie et EDP", Nancy (France) .
 03/2018 : Meeting "Young French PDEsts", Nancy (France).
 07/2018 : Session "Geometric and Nonlinear PDEs", AIMS, Taipei (Taiwan).
 05/2023 : 1-day workshop "Nonlinear and Geometric Analysis", Nancy (France).

Editorial activities :

Associate editor of "International Journal of Mathematics and Mathematical Sciences" (2009-2014) and "International Journal of Analysis" (2012-2014).

2. Research grants, projects, bonus

2009-2012 : Member of the CNRS ANR grant "Concentration in Analysis and GEometry" (CAGE).
 2010-2011 : two annual "Young researcher" grants funded by Université Nancy 1 and "Région Lorraine".
 2011-2012 : two annual "Hubert Curien" grants between Nancy and Hong-Kong (J.Weï).
 2012-2015 : PhD fellowship (co-directed with Dong Ye (Metz)) funded by Fédération Charles Hermite (Lorraine) and "Région Lorraine".
 2005-2007 ; 2018-2022 : Bonus for Doctoral Supervision and Research ("Prime d'Encadrement Doctorale et de Recherche").
 2015-2016 : Research grant funded by Université de Lorraine and Région Lorraine.
 2019-2021 : ARC (Australian Research Council) grant "Nonlinear PDEs with anisotropy and singularities". Two-researchers consortium.
 2020-2022 : CNRS grant "International Emerging Action", project DEGENERATE. Two-researchers consortium.
 2020-2022 : Project PROMETEUS (member, project managed by CIMI Toulouse).

3. Talks in conferences and seminars

- 12/2000 : Series of talks, Università degli Studi Roma Tre (Italy).
 01/2001 : PDE seminar, Université de Cergy-Pontoise (France).
 03/2001 : Analysis seminar, Université d'Amiens (France).
 01/2002 : Geometry seminar, Université de Nancy (France).
 01/2002 : Analysis seminar, Université de Tours (France).
 02/2002 : Colloquium, Tata Institute, Bangalore (India).
 03/2002 : Series of talks, Università degli Studi Roma Tre (Italy).
 10/2002 : Analysis seminar, ETH Zürich (Switzerland).
 01/2003 : Colloquium, Fribourg Universität (Switzerland).
 02/2003 : PDE and Geometry seminar, University of Notre Dame (USA).
 02/2003 : Geometric analysis seminar, Princeton University (USA).
 03/2003 : Analysis and Geometry seminar, Université de Nice (France).
 04/2003 : Complex Geometry seminar, Université de Marseille I (France).
 06/2003 : Department seminar, Université de La Rochelle (France).
 08/2003 : Conference "Partial Differential Equations", Oberwolfach (Germany).
 09/2003 : Conference "Affine Differential Geometry", Bedlewo (Poland).
 01/2004 : Analysis seminar, Université d'Amiens (France).
 01/2004 : Analysis seminar, ETH Zürich (Switzerland).
 03/2004 : PDEs and applications seminar, ENS Lyon (France).
 11/2004 : Differential Geometry and Pde seminar, University of British Columbia, Vancouver (Canada).
 03/2005 : Conference "Recent Advances in Calculus of Variations and PDEs", Pisa (Italy).
 05/2005 : Conference "Analytic Aspects of Problems in Riemannian Geometry", Brest (France).
 09/2005 : Conference "Interactions between Complex Geometry and Real Analysis", Hanover (Germany).
 11/2005 : Complex Geometry seminar, Université de Marseille I (France).
 02/2006 : Analysis seminar, Université de Reims (France).
 02/2006 : Differential Geometry and Pde seminar, University of British Columbia, Vancouver (Canada).
 03/2006 : Series of lectures, University of Wisconsin, Madison (USA).
 03/2006 : Geometric analysis seminar, University of Wisconsin, Madison (USA).
 04/2006 : Analysis seminar, ETH Zürich (Switzerland).
 05/2006 : Seminar, Università degli Studi Roma "Tor Vergata" (Italy).
 06/2006 : Analysis seminar, University of Warwick (England).
 06/2006 : AIMS Conference, Poitiers (France).
 12/2006 : Algebra and Geometry seminar, Université de Brest (France).
 01/2007 : Differential Geometry and analysis seminar, Universität Magdeburg (Germany).
 01/2007 : Analysis seminar, Université d'Amiens (France).
 02/2007 : Lecture series in PDE, Chinese University of Hong-Kong (Hong-Kong).
 02/2007 : Colloquium, Chinese University of Hong-Kong (Hong-Kong).
 08/2007 : Conference "Loss of compactness in nonlinear PDE : Recent trends", Banff (Canada).
 11/2007 : Colloquium, Australian National University, Canberra (Australia).
 01/2008 : MIP seminar, Université de Toulouse III (France).

- 02/2008 : Analysis seminar, SISSA, Trieste (Italy).
- 06/2008 : Second Canada-France Congress of Mathematics 2008, Montréal.
- 06/2008 : Conference "Conformal Geometry : invariant theory and the variational method", Roscoff (France).
- 10/2008 : Complex Geometry seminar, Université de Marseille I (France).
- 11-12/2008 : "Elie Cartan" Lectures, Technische Universität, Berlin (Germany)
- 01/2009 : Journées Nancéiennes de Géométrie, Université de Nancy I (France).
- 02/2009 : Geometric analysis seminar, Albert-Einstein-Institut, Potsdam (Germany).
- 02/2009 : Geometry seminar, Technische Universität, Berlin (Germany).
- 03/2009 : Analysis seminar, Freie Universität, Berlin (Germany).
- 03/2009 : Geometry seminar, Humboldt Universität, Berlin (Germany).
- 04/2009 : Analysis seminar, ETH Zürich (Switzerland).
- 05/2009 : Conference "Nonlinear analysis and related problems", Université de Cergy-Pontoise (France).
- 07/2009 : Conference "Asymptotic analysis in the calculus of variations and PDEs", University of British Columbia, Vancouver (Canada).
- 09/2009 : Conference "Workshop in Nonlinear Elliptic PDEs" celebrating Jean-Pierre Gossez 65th birthday, Université libre de Bruxelles (Belgium).
- 10/2009 : Conférence " Problèmes non linéaires avec perte de compacité : perspectives et applications", Luminy (France).
- 10/2009 : Geometry and Analysis seminar, Université de Nice (France).
- 10/2009 : Interregional Colloquium, Universität des Saarlandes (Germany).
- 11/2009 : Analysis seminar, Chinese University of Hong-Kong (Hong-Kong).
- 12/2009 : Analysis, Geometry and Algebra seminar, Université de Metz (France).
- 04/2010 : Series of talks, Tata Institute, Bangalore (India).
- 06/2010 : Geometry and Analysis seminar, Université de Nice (France).
- 07/2010 : France-Asia summer school "Singularities in pdes", IHES (France).
- 11/2010 : Series of talks, University of Sydney (Australia).
- 11/2010 : Analysis and pde seminar, Australian National University, Canberra.
- 05/2011 : Analysis seminar, Köln Universität (Germany).
- 05/2011 : Conference "Higher Order equations in Geometry and Physics", SISSA, Trieste (Italy).
- 06/2011 : Conference "Recent Advances On Elliptic Issues", Université de Besançon (France).
- 01/2012 : Conference "Cocompact embeddings and profile decompositions", TIFR Bangalore (India).
- 05/2012 : Conference "Workshop on Nonlinear Partial Differential Equations to celebrate the Sixtieth Birthday of Patrizia Pucci", Università degli Studi di Perugia (Italy).
- 06/2012 : Conference "Higher Order Problems in Geometric Analysis", University of Bath (England).
- 06/2012 : Algebra and Geometry seminar, Université de Brest (France).
- 11/2012 : Analysis seminar, Chinese University of Hong-Kong (Hong-Kong).
- 11/2012 : Conference "Geometric PDEs", IHP, Paris (France).
- 11/2012 : Conference "Singular limit problems in nonlinear PDEs", CIRM, Marseille (France).
- 04/2013 : Pde seminar, Pontificia Universidad Católica de Chile.

- 07/2013 : Conference "Nonlinear PDEs, Functional Analysis, and Applications : in Celebration of Nassif Ghoussoub's 60th Birthday", Vancouver (Canada).
- 12/2013 : Conference "Geometric variational problems", Banff (Canada).
- 03/2013 : Differential Geometry/PDE seminar, University of Washington (USA).
- 05/2014 : Conference "Geometric Aspects of Semilinear Elliptic and Parabolic Equations : Recent Advances and Future Perspectives", Banff (Canada).
- 06/2014 : Conference "Rencontre Niçoise d'Analyse Géométrique", Nice (France).
- 06/2014 : Conference "PDEs in Geometry and Physics", University of Notre-Dame (USA).
- 11/2014 : Analysis Seminar, Universität Basel (Suisse).
- 02/2015 : Nonlinear Analysis and PDE seminar, Université Libre de Bruxelles (Belgique).
- 04/2015 : PDE seminar, University of Sydney (Australia).
- 04/2015 : PDE seminar, University of Wollongong (Australia).
- 05/2015 : Geometry Symposium, Université de Brest (France).
- 07/2015 : Conference EquaDiff 2015. Minisymposium "New Trends on Concentration Phenomena in Nonlinear Elliptic Equations", Lyon (France).
- 02/2016 : Geometric Analysis seminar, McGill University, Montréal (Canada).
- 11/2016 : PDE seminar, University of Sydney (Australia).
- 11/2016 : International conference on nonlinear partial differential equations, A celebration of Professor Norman Dancer's 70th birthday, University of New England, Armidale (Australia).
- 05/2017 : PDE Workshop ULB-UCL, Université Catholique de Louvain (Belgium).
- 05/2017 : Conference "Geometric Properties of Local and non-Local PDEs", Oaxaca BIRS (Mexico).
- 06/2017 : Rencontre d'Analyse Géométrique, University of Nice (France).
- 06/2017 : Conference "Nonlinear Analysis in Rome", University of Notre Dame in Rome (Italy).
- 10/2017 : Conference "Elliptic PDEs of 2nd order : celebrating 40 years of Gilbarg and Trudinger's book", Melbourne (Australia).
- 11/2017 : Conference "First Belgium+Chile+Italy conference in PDE", Université Libre de Bruxelles (Belgium).
- 03/2018 : Workshop "Geometric Analysis", CRM Montréal (Canada).
- 05/2018 : Conference on Positivity and Differential Equations, Köln (Deutschland).
- 11/2018 : "A seminar day on elliptic problems", Nancy (France).
- 05/2019 : Conference "Nonlinear Geometric PDEs", Banff BIRS (Canada).
- 12/2019 : Workshop "Journée FNRS", Bruxelles (Belgium).
- 05/2020 : Geometric Online Seminar, McGill University (Montréal).
- 05/2020 : Conference "Geometric and Analytical Aspects of Nonlinear Elliptic Equations and Related Evolution Problems", Oaxaca BIRS (Mexico, postponed).
- 12/2020 : Conference "Geometric PDEs", Nouakchott (Mauritanie). Online.
- 06/2021 : Conference "Canadian Mathematical Society 75+1th anniversary meeting", Ottawa (Canada) (online, initially scheduled in 2020).
- 09/2021 : Conference "Geometric PDEs @ Caserta", Caserta (Italy) (initially scheduled in 2020).
- 09/2021 : Conference "Three days of PDEs, friendship, love and nonlinearities", Pisa (Italy) (initially scheduled in 2020).

- 09/2021 : Conference "Nonlinear Potential Theoretic Methods in Partial Differential Equations", Banff (Canada) (online).
 05/2022 : Seminar, Università degli studi Roma 3 (Italia).
 11/2022 : Conference "Nonlinear PDEs and applications, a celebration of Yihong Du's 60th birthday", Sydney (Australia).
 11/2022 : PDE Seminar, University of Sydney (Australia).
 06/2023 : Conference "Sobolev inequalities in the Alps", Grenoble (France).
 05/2024 : Workshop "Analysis of Geometric Singularities", Montréal (Canada).

4. Invitations by foreign institutions

- 12/2000 : Università degli Studi Roma Tre (Italy).
 02/2002 : Tata Institute, Bangalore (India).
 03/2002 : Università degli Studi Roma Tre (Italy).
 02/2003 : University of Notre Dame (USA).
 02/2003 : Princeton University (USA).
 01/2004 : ETH Zürich (Switzerland).
 11/2004 : University of British Columbia, Vancouver (Canada).
 07/2005 : University of British Columbia, Vancouver (Canada).
 02/2006 : University of British Columbia, Vancouver (Canada).
 03/2006 : University of Wisconsin at Madison (USA).
 04/2006 : ETH Zürich (Switzerland).
 05/2006 : Università degli Studi Roma "Tor Vergata" (Italy).
 01/2007 : Universität Magdeburg (Germany).
 02/2007 : Chinese University of Hong-Kong (Hong-Kong).
 05/2007 : Università degli Studi di Perugia (Italy).
 08/2007 : University of British Columbia, Vancouver (Canada).
 11/2007 : Australian National University, Canberra (Australia).
 02/2008 : Chinese University of Hong-Kong (Hong-Kong).
 06/2008 : McGill University, Montréal (Canada).
 11/2008 : Università degli Studi Roma "Tor Vergata" (Italy).
 02/2009 : Technische Universität Berlin (Germany).
 02/2009 : Universität Magdeburg (Germany).
 04/2009 : ETH Zürich (Switzerland).
 07/2009 : University of Washington, Seattle (USA).
 07/2009 : University of British Columbia, Vancouver (Canada).
 11/2009 : Chinese University of Hong-Kong (Hong-Kong).
 04/2010 : Tata Institute, Bangalore (India).
 04/2010 : Chinese University of Hong-Kong (Hong-Kong).
 10/2010 : University of Sydney (Australia).
 08/2011 : Universität Magdeburg (Germany).
 10/2011 : Chinese University of Hong-Kong (Hong-Kong).
 08/2012 : McGill University, Montréal (Canada).
 11/2012 : Chinese University of Hong-Kong (Hong-Kong).
 04/2013 : Pontificia Universidad Católica de Chile, Santiago (Chile).
 04/2015 : University of Sydney (Australia).
 02/2016 : McGill University, Montréal (Canada).
 07/2016 : University of British Columbia, Vancouver (Canada).
 11/2016 : University of Sydney (Australia).

02/2020 : University of British Columbia (Canada).
 06/2020 : McGill University, Montréal (Canada) (canceled).
 11/2022 : University of Sydney (Australia).

5. Publications

Main publications :

- [1] Asymptotic behaviour of a nonlinear elliptic equation with critical Sobolev exponent. The radial case. *Advances in Differential Equations*, **6**, (2001), 821-846.
- [2] Asymptotic profile for the sub-extremals of the sharp Sobolev inequality on the sphere, with O.Druet.
Communications in Partial Differential Equations, **26**, (2001), 743-778.
- [3] Coercivity and Struwe's compactness for Paneitz type operators with constant coefficients, with E.Hebey.
Calculus of Variations and Partial Differential Equations, **13**, (2001), 491-517.
- [4] Asymptotic behaviour of a nonlinear elliptic equation with critical Sobolev exponent. The radial case II.
Nonlinear Differential Equations and Applications, **9**, (2002), 361-384.
- [5] Mountain pass critical points for Paneitz-Branson operators, with P.Esposito.
Calculus of Variations and Partial Differential Equations, **15**, (2002), 493-517.
- [6] Positive solutions for a fourth order equation invariant under isometries.
Proceedings of the AMS, **131**, (2003), 1423-1431.
- [7] Blow-up theory for elliptic PDEs in Riemannian geometry, with O.Druet and E.Hebey. *Mathematical Notes, Princeton University Press*, Volume 45.
- [8] Sharp solvability conditions for a fourth order equation with perturbation, with K.Sandeep. *Differential and Integral Equations*, **16**, (2003), 1181-1214.
- [9] Asymptotic profile for a fourth order PDE with critical exponential growth in dimension four, with M.Struwe. *Advanced Nonlinear Studies*, **4**, (2004), 397-415.
- [10] Compactness and global estimates for the geometric Paneitz equation in high dimensions, with E.Hebey.
Electronic Research Announcements of the AMS, **10**, (2004), 135-141.
- [11] Critical functions and optimal Sobolev inequalities.
Mathematische Zeitschrift, **249**, (2005), 485-492.
- [12] Fourth order equations of critical Sobolev growth. Energy function and solutions of bounded energy in the conformally flat case, with V. Felli and E. Hebey.
Nonlinear Differential Equations and Applications, **12**, (2005), 171-213.
- [13] Bubbling phenomena for fourth-order four-dimensional PDEs with exponential growth, with O.Druet. *Proceedings of the AMS*, **134**, (2006), 897-908.
- [14] Compactness and global estimates for a fourth order equation of critical Sobolev growth arising from conformal geometry, with E.Hebey and Y.Wen.
Communications in Contemporary Mathematics, **8**, (2006), 9-65.
- [15] Concentration estimates for Emden-Fowler equations with boundary singularities and critical growth, with N.Ghoussoub.
International Mathematics Research Papers (IMRP), Volume 2006, ID 21867, 1-85.
- [16] Concentration phenomena for Liouville's equation in dimension four, with Adimurthi and M.Struwe.

- Journal of the European Mathematical Society*, **8**, (2006), 171-180.
- [17] The effect of curvature on the best constant in Hardy-Sobolev inequalities, with N.Ghoussoub. *Geometric And Functional Analysis (GAFA)*, **16**, (2006), 1201-1245.
- [18] Concentration phenomena for a fourth order equation with exponential growth : the radial case. *Journal of Differential Equations*, **231**, (2006), 135-164.
- [19] Quantization effects for a fourth order equation of exponential growth in dimension four. *The Royal Society of Edinburgh Proceedings A*, **137A**, (2007), 531-553.
- [20] On the local Nirenberg problem for the Q -curvatures, with Ph.Delanoë. *Pacific Journal of Mathematics*, **231**, (2007), 293-304.
- [21] On the influence of the Kernel of the bi-harmonic operator on fourth order equations with exponential growth. Sixth international conference on "Dynamical Systems and Differential Equations", Poitiers, Juin 2006. *Discrete and continuous dynamical systems*, Supplément 2007, 875-882.
- [22] Asymptotic behavior of a fourth order mean field equation with Dirichlet boundary condition, with J.Wei. *Indiana University Mathematics Journal*, **57**, (2008), 2039-2060.
- [23] Elliptic equations with critical growth and a large set of boundary singularities, with N.Ghoussoub. *Transactions of the AMS*, **361**, (2009), no. 9, 4843-4870.
- [24] On a p -Laplace equation with multiple critical nonlinearities, with R.Filippucci and P.Pucci. *Journal des Mathématiques Pures et Appliquées*, **91**, (2009), 156-177.
- [25] Positivity and almost positivity of biharmonic Green's functions under Dirichlet boundary conditions, with H.-Ch.Grunau. *Archive for Rational Mechanics and Analysis*, **195**, (2010) 865-898.
- [26] The heat flow with a critical exponential nonlinearity, with T.Lamm and M.Struwe. *Journal of Functional Analysis*, **257**, (2009), 2951-2998.
- [27] Admissible Q -curvatures invariant under isometries for the general GJMS operators. *Contemporary Mathematics*, Volume en l'honneur de Jean-Pierre Gossez, **540**, 241-259 (2011).
- [28] Asymptotic analysis for fourth order Paneitz equations with critical growth, with E.Hebey. *Advances in the Calculus of Variations*, **4**, (2011), no. 3, 229-275.
- [29] Optimal estimates from below for biharmonic Green functions, with H.-Ch.Grunau and G.Sweers. *Proceedings of the AMS*, **139**, (2011), no. 6, 2151-2161.
- [30] The Lin-Ni's conjecture for mean convex domains, with O.Druet and J.Wei. *Memoirs of the American Mathematical Society*, **218**, (2012), 105pp.
- [31] Sign-changing blow-up for scalar curvature type equations, with J.Vétois. *Communications in Partial Differential Equations*, **38**, 8, (2013), 1437-1465.
- [32] Uniform estimates for polyharmonic Green functions in domains with small holes, with H.-Ch.Grunau. *Contemporary Mathematics*, **595**, (2013), 263-272.
- [33] A general theorem for the construction of blowing-up solutions to some elliptic nonlinear equations via Lyapunov-Schmidt's finite-dimensional reduction, with J.Vétois. In "Concentration Compactness and Profile Decomposition (Bangalore, 2011)", *Trends in Mathematics*, 95-116, Springer.
- [34] Examples of non-isolated blow-up for perturbations of the scalar curvature equation on non-locally conformally flat manifolds, with J.Vétois.

Journal of Differential Geometry, **98**, (2014), 349-356.

[35] Sign-changing solutions to elliptic second order equations : glueing a peak to a degenerate critical manifold, with J.Vétois. *Calculus of Variations and PDEs*, **54**, (2015), 693-716. DOI : 10.1007/s00526-014-0802-1.

[36] On the Hardy-Schrödinger operator with a boundary singularity, with N.Ghoussoub. *Analysis & PDEs*, **10-5**, (2017), 1017-1079. DOI 10.2140/apde.2017.10.1017.

[37] Sobolev inequalities for the Hardy-Schrödinger operator : Extremals and critical dimensions, with N.Ghoussoub. *Bulletin of Mathematical Sciences*, **6**, (2016), no. 1, 89-144. DOI : 10.1007/s13373-015-0075-9.

[38] Sharp asymptotic profiles for singular solutions to an elliptic equation with a sign-changing nonlinearity, with F.Cirstea. *Proceedings of the London Mathematical Society*, (3), **114**, (2017), 1-34. DOI : 10.1112/plms.12003.

[39] Nondegeneracy of positive solutions to nonlinear Hardy-Sobolev equations. *Advances in Nonlinear Analysis*, **6**, (2017), no. 2, 237-242. DOI : 10.1515/anona-2016-0267.

[40] The Hardy-Schrödinger operator with interior singularity : The remaining cases, with N.Ghoussoub. *Calculus of variations and PDEs*, **56**, (2017), no. 5, Art. 149.

[41] Mass and asymptotics associated to fractional Hardy-Schrödinger operators in critical regimes, with N.Ghoussoub, S.Shakerian and M.Zhao. *Communications in PDEs*, **43**, (2018), 859-892. DOI : 10.1080/03605302.2018.1476528.

[42] Examples of sharp asymptotic profiles of singular solutions to an elliptic equation with a sign-changing non-linearity, with F.Cirstea and J.Vétois. *Mathematische Annalen*, **375**, (2019), no 3-4, 1193-1230.

[43] The Hardy-Schrödinger Operator on the Poincaré Ball : Compactness and Multiplicity for interior singularity, with N.Ghoussoub and S.Mazumdar. *Journal of Differential Equations*, **322**, (2022), 510-557.

[44] Multiplicity and stability of the Pohozaev obstruction for Hardy-Schrödinger equations with boundary singularity, with N.Ghoussoub and S.Mazumdar. *Memoirs of the AMS*, **285**, Number 1415, (2023), 1-112pp, . DOI : <https://doi.org/10.1090/memo/1415>

[45] Blowing-up solutions for second-order critical elliptic equations : the impact of the scalar curvature, with Jérôme Vétois. *IMRN*, **2**, (2023), 901-931.

Other publications :

Unpublished texts are available on <http://iecl.univ-lorraine.fr/~Frederic.Robert/>.

[1] Étude asymptotique d'une équation non-linéaire à croissance de Sobolev critique. *Preprint (not submitted)*, (1999), 40 pages.

[2] On the equivalence of the Kazdan-Warner and the Pohozaev identities, with O. Druet. *Preprint not submitted*, (1999), 2 pages.

[3] Asymptotic profile and blow-up estimates on compact Riemannian manifolds, with O.Druet. *Preprint*, (2000), 21 pages. Reproduced in "The *AB* program in Geometric Analysis. Sharp Sobolev inequalities and related problems", by O.Druet and E.Hebey, *Memoirs of the AMS*, **160**, (2002).

[4] Struwe's compactness for free functionals involving the bi-harmonic operator. *Preprint not submitted*, (2000), 22 pages.

[5] A C^0 -theory for the blow-up of second order elliptic equations of critical Sobolev growth, with O.Druet and E.Hebey.

- Electronic Research Announcements of the AMS*, **9**, (2003), 19-25.
- [6] Sobolev spaces on manifolds, with E.Hebey. *Handbook of global analysis*, 375-415, 1213, *Elsevier Sci. B. V., Amsterdam*, 2008.
- [7] Extremals for Hardy-Sobolev type inequalities : the influence of the curvature. "*Analytic aspects of problems in Riemannian geometry : Elliptic PDEs, solitons and computer imaging*", Séminaires et Congrès **22**, (2011), 1-15.
- [8] Boundedness of the negative part of biharmonic Green's functions under Dirichlet boundary conditions in general domains, with H.-Ch.Grunau. *C. R. Acad. Sci. Paris, Ser. I*, **347**, (2009), no. 3-4, 163-166.
- [9] Existence et asymptotiques optimales des fonctions de Green des opérateurs elliptiques d'ordre deux. *Preprint not submitted*, (2010),
- [10] Fourth order equations with critical growth in Riemannian geometry. Notes from lectures given at Madison and Berlin (2009).
- [11] Construction and asymptotics for the Green's function with Neumann boundary condition. *Preprint not submitted*, (2010).
- [12] Extremals for the Hardy-Sobolev inequalities on cones, avec N.Ghoussoub. Informal note (2015). This is a chapter from the reference [36].
- [13] Green's function for a singular Hardy-type operator with boundary singularity. *Preprint not submitted*, (2017).

6. Teaching

- 1998-2002 : Cergy-Pontoise University.
- 2002-2003 : ETH Zürich.
- 2003-2009 : University of Nice.
- 2009- : University Nancy 1/ University of Lorraine.
- Fall 2013 : University of British Columbia.
- March 2006 : Séries of lectures at the University of Wisconsin, Madison (USA)
- January 2012 : Short course in the programme "School and Workshop on Cocompact Imbeddings, Profile Decompositions, and their Applications to PDEs", TIFR Bangalore, India.
- February 2015 : Short course "Variational and Geometric Methods in Nonlinear PDEs", African Institute for Mathematical Sciences (AIMS), Mbour, Sénégal.
- April 2016 : Short course in the Simons Programme "Non Linear Analysis, Geometry and Applications", Dakar, Sénégal.
- July-August 2020 : 4 weeks graduate lecture on Functional Analysis, Summer Course in Perugia (Italy).
- July-August 2021 : 4 weeks graduate lecture on Functional Analysis, Summer Course in Perugia (Italy).
- July-August 2023 : 4 weeks graduate lecture on Functional Analysis, Summer Course in Perugia (Italy).

7. PhD and Habilitation committees

7.1. Committees :

- Pieralberto Sicbaldi (PhD directed by F.Pacard, defended December 2009).

- Jean-Baptiste Casteras (PhD directed by A.Fardoun and R.Regbaoui, defended November 2012).
- Jean-François Grosjean (French "Habilitation to conduct Research", defended June 2015).
- Laurent Kayser (PhD directed by M.Choulli, defended December 2015).
- Jérôme Vétois (French "Habilitation to conduct Research", defended June 2017).
- Giulio Romani (PhD directed by F.Hamel, E.Parini and B.Ruf, defended October 2017).
- Iury Domingos (PhD directed by Benoît Daniel, june 2020).
- Sabina Angeloni (PhD directed by P.Esposito, defended May 2022)
- Thanh Trung Le (PhD directed by L.Jeanjean, defended October 2022).
- Thomas Giletti (French "Habilitation to conduct Research", defended December 2022).

7.2. Referee :

- PhD thesis of Yaxin Peng (directed by O.Druet and C.-L.Shen, defended October 2008).
- "Habilitation universitaire" (Tunisie) of Mohammed Jleli, defended May 2010.
- PhD thesis of Jean-Baptiste Casteras (directed by par A.Fardoun and R.Regbaoui, defended November 2012).
- PhD thesis of Alessandro Iacopetti (directed by F.Pacella, defended March 2015).
- PhD thesis of Giulio Romani (directed by F.Hamel, E.Parini and B.Ruf, defended October 2017).
- PhD thesis of El Hadji Thiam (directed by M.M.Fall and M.Sanghare, defended December 2017).
- PhD thesis of Laura Baldelli (directed by R.Filippucci, defended March 2022).
- PhD thesis of Thanh Trung Le (directed by L.Jeanjean, defended October 2022).

8. Doctoral activities

8.1. **Bachelor and Master.** Supervision of 2-3 Master Thesis every year. Supervision of research projects of engineering students.

8.2. Supervised PhD Thesis.

- (1) Hassan Jaber, defended in June 2014. Hassan Jaber is now Chairperson of the Mathematics Department at the Arts, Sciences and Technology University in Lebanon.
- (2) Saikat Mazumdar, co-direction with Dong Ye (Metz), defended June 2016. After 2 years of Postdoc in UBC Vancouver and 6 months at McGill (Montréal), Saikat Mazumdar has obtained an Associate Professor position in the Indian Institute of Technology Bombay.
- (3) Hussein Cheikh Ali, co-direction with Denis Bonheure (Bruxelles, Belgium). Defended December 2019. Hussein Cheikh-Ali is currently assistant in Bruxelles.
- (4) Hussein Mesmar, defended December 2021. Hussein Mesmar is currently Assistant in Nancy.

8.3. **Pre-doctoral students.** M.Bekiri (May 2011) and H.Boughazi (November 2012).

8.4. **Post-doctoral student.** Isabella Fabbri (Roma Tre) in 2007. Ali Rimouche (December 2017).

9. National expertises

Evaluation of research units : member of evaluation committee of IMAG (math department Montpellier) in 2020.

10. International expertises :

International journals. Referee in several journals, among them : Advances in Mathematics, Analysis and PDEs, Annales de l'Institut Henri Poincaré, Commentarii Mathematici Helvetici, Compositio Mathematica, Communications in PDEs, Calculus of Variations and PDEs, Communications in Contemporary Mathematics, IMRN, Indiana University Mathematical Journal, Journal of Functional Analysis, Journal of Differential Equations, Mathematische Annalen, Mathematisches Zeitschrift, Journals of the AMS, Nonlinear Analysis, Nonlinearity, Proceedings of the London Mathematical Society, Inventiones Mathematicae.

Evaluation of promotion, hiring, conference proposals : Swiss National Funds, University of Antwerp (Belgium), Fonds de Recherche du Québec (Canada), Banff International Research Station (BIRS, Canada), Marsden Funds (New-Zealand), Australian Mathematical Society, Sapienza Università di Roma, King Baudoin Foundation, FNRS (Belgium), Ben-Gurion University (Israël), IMAG Granada (Spain).