

# Jérôme VÉTOIS

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## Positions

- 2015 – Assistant Professor, tenure-track, McGill University, Montreal, Canada  
Member of the Mathematical Analysis Laboratory of the CRM, International Joint Unit of the CNRS, France
- 2009 – *Maître de Conférences* (Assistant/Associate Professor, tenured), University of Nice Sophia Antipolis, France. On leave since Aug. 2015.
- 2008 – 2009 *Attaché Temporaire d’Enseignement et de Recherche* (Assistant Professor, one-year term), University of Cergy-Pontoise, France

## Diplomas

- 2017 Habilitation thesis, University of Nice Sophia Antipolis, France.  
Defended on June 22, 2017.
- 2008 Ph.D. thesis, University of Cergy-Pontoise, France.  
Defended on December 4, 2008. Supervisor: Emmanuel Hebey.
- 2005 *Agrégation de Mathématiques* (nationwide examination for teaching in France)

## Research areas

- Nonlinear partial differential equations
- Nonlinear analysis on manifold

## Preprint

- [25] P.-D. Thizy and J. Vétois, *Positive clusters for smooth perturbations of a critical elliptic equation in dimensions four and five*. Preprint on arXiv:1603.06479.

## Peer-reviewed journal articles

- [24] J. Vétois, *Decay estimates and symmetry of finite energy solutions to elliptic systems in  $R^n$* , Indiana University Mathematics Journal. To appear.
- [23] J. Vétois and S. Wang, *Infinitely many solutions for cubic nonlinear Schrödinger equations in dimension four*, Advances in Nonlinear Analysis. To appear.
- [22] J. Vétois, *A priori estimates and application to the symmetry of solutions for critical  $p$ -Laplace equations*, Journal of Differential Equations **260** (2016), no. 1, 149–161.
- [21] O. Druet, E. Hebey, and J. Vétois, *Static Klein–Gordon–Maxwell–Proca systems in 4-dimensional closed manifolds II*, Journal für die reine und angewandte Mathematik **713** (2016), 149–179.

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Date: November 6, 2017

- [20] J. Vétois, *Decay estimates and a vanishing phenomenon for the solutions of critical anisotropic equations*, *Advances in Mathematics* **284** (2015), 122–158.
- [19] F. Robert and J. Vétois, *Sign-changing solutions to elliptic second order equations: glueing a peak to a degenerate critical manifold*, *Calculus of variations and Partial Differential Equations* **54** (2015), no. 1, 693–716.
- [18] F. C. Cirstea and J. Vétois, *Fundamental solutions for anisotropic elliptic equations: existence and a priori estimates*, *Communications in Partial Differential Equations* **40** (2015), no. 4, 727–765.
- [17] J. Vétois, *Continuity and injectivity of optimal maps*, *Calculus of variations and Partial Differential Equations* **52** (2015), no. 3, 587–607.
- [16] F. Robert and J. Vétois, *Examples of non-isolated blow-up for perturbations of the scalar curvature equation*, *Journal of Differential Geometry* **98** (2014), no. 2, 349–356.
- [15] P. Esposito, A. Pistoia, and J. Vétois, *The effect of linear perturbations on the Yamabe problem*, *Mathematische Annalen* **358** (2014), no. 1–2, 511–560.
- [14] F. Robert and J. Vétois, *Sign-changing blow-up for scalar curvature type equations*, *Communications in Partial Differential Equations* **38** (2013), no. 8, 1437–1465.
- [13] A. Pistoia and J. Vétois, *Sign-changing bubble towers for asymptotically critical elliptic equations on Riemannian manifolds*, *Journal of Differential Equations* **254** (2013), no. 11, 4245–4278.
- [12] P. Esposito, A. Pistoia, and J. Vétois, *Blow-up solutions for linear perturbations of the Yamabe equation*, *Concentration Analysis and Applications to PDE (ICTS Workshop, Bangalore, 2012)*, *Trends in Mathematics*, Birkhäuser/Springer Basel, 2013, 29–47.
- [11] F. Robert and J. Vétois, *A general theorem for the construction of blowing-up solutions to some elliptic nonlinear equations via Lyapunov-Schmidt’s finite-dimensional reduction*, *Concentration Analysis and Applications to PDE (ICTS Workshop, Bangalore, 2012)*, *Trends in Mathematics*, Birkhäuser/Springer Basel, 2013, 85–116.
- [10] J. Vétois, *Strong maximum principles for anisotropic elliptic and parabolic equations*, *Advanced Nonlinear Studies* **12** (2012), no. 1, 101–114.
- [9] J. Vétois, *Existence and regularity for critical anisotropic equations with critical directions*, *Advances in Differential Equations* **16** (2011), no. 1/2, 61–83.
- [8] J. Vétois, *The blow-up of critical anisotropic equations with critical directions*, *NoDEA Nonlinear Differential Equations and Applications* **18** (2011), no. 2, 173–197.
- [7] O. Druet, E. Hebey, and J. Vétois, *Bounded stability for strongly coupled critical elliptic systems below the geometric threshold of the conformal Laplacian*, *Journal of Functional Analysis* **258** (2010), no. 3, 999–1059.
- [6] J. Vétois, *Asymptotic stability, convexity, and Lipschitz regularity of domains in the anisotropic regime*, *Communications in Contemporary Mathematics* **12** (2010), no. 1, 35–53.
- [5] J. Vétois, *A priori estimates for solutions of anisotropic elliptic equations*, *Nonlinear Analysis: Theory, Methods & Applications* **71** (2009), no. 9, 3881–3905.

- [4] A. M. Micheletti, A. Pistoia, and J. Vétois, *Blow-up solutions for asymptotically critical elliptic equations on Riemannian manifolds*, Indiana University Mathematics Journal **58** (2009), no. 4, 1719–1746.
- [3] A. El Hamidi and J. Vétois, *Sharp Sobolev asymptotics for critical anisotropic equations*, Archive for Rational Mechanics and Analysis **192** (2009), no. 1, 1–36.
- [2] E. Hebey and J. Vétois, *Multiple solutions for critical elliptic systems in potential form*, Communications on Pure and Applied Analysis **7** (2008), no. 3, 715–741.
- [1] J. Vétois, *Multiple solutions for nonlinear elliptic equations on compact Riemannian manifolds*, International Journal of Mathematics **18** (2007), no. 9, 1071–1111.

<b>Talks at seminars and conferences</b>
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- 2017 Fall Western AMS Sectional Meeting, Session on Nonlinear Elliptic Differential and Integral Equations, University of California, Riverside, US (Nov. 4-5, 2017).  
 Workshop “Elliptic Partial Differential Equations of Second Order: Celebrating 40 Years of Gilbarg and Trudingers Book”, MATRIX, Melbourne, Australia (October 23-28, 2017)  
 Workshop “Geometric Properties of Local and non-Local PDEs”, BIRS, Oaxaca, Mexico (May 25, 2017)  
 PDE seminar, University of Lorraine, Metz (Mar. 3, 2017)  
 France-Italy meeting in Geometric Analysis, Centro di Ricerca Matematica Ennio de Giorgi, Pisa, Italy (Feb. 22, 2017)
- 2016 International conference on nonlinear partial differential equations: A Celebration of Professor Norman Dancer’s 70th birthday, University of New England, Armidale, Australia (Nov. 22, 2016)  
 Summer Meeting of the Canadian Mathematical Society, PDE session, Edmonton, Canada (Jun. 26, 2016).  
 Geometry and topology seminar, CIRGET, Montreal, Canada (Feb. 26, 2016)  
 Quebec Mathematical Sciences Colloquium, CRM, Montreal, Canada (Jan. 29, 2016)
- 2015 Conference “Geometric CORP”, Domain of Seillac, France (Sept. 17, 2015)  
 17th Mathematical Meeting of Rouen, University of Rouen, France (Jun. 18, 2015)  
 Harmonic analysis seminar, University Paris-Sud, Orsay, France (Jan. 12, 2015)  
 Analysis seminar, McGill University, Montreal, Canada (Jan. 5, 2015)
- 2014 8th Australia New Zealand Mathematics Convention, Harmonic Analysis and PDE session, University of Melbourne, Australia (Dec. 8, 2014)  
 PDE and analysis seminar, MSI, ANU, Canberra, Australia (Nov. 18, 2014)  
 PDE seminar, University of Sydney, Australia (Oct. 20, 2014)  
 Inter-teams workshop of the Laboratory J.A. Dieudonné, Lake of Como, Italy (Sept. 24, 2014)

- Joint regional seminar on geometric analysis, CIRM, Marseille, France (Sept. 6, 2014)
- 12th Franco-Romanian Conference on Applied Mathematics, Analysis session, University of Lyon, France (Aug. 25, 2014)
- 5th IST-IME Meeting, University of São Paulo, Brazil (Aug. 1st, 2014)
- 2013 Geometry and analysis seminar, University of Nice Sophia Antipolis, France (Sept. 26, 2013)
- Geometric analysis and PDE seminar, University of Wollongong, Australia (Sept. 3, 2013)
- PDE seminar, University of Sydney, Australia (Sept. 2, 2013)
- PDE and analysis seminar, MSI, ANU, Canberra, Australia (Aug. 27, 2013)
- 2012 Seminar of the program “Conformal and Kähler Geometry”, IHP, Paris, France (Nov. 14, 2012)
- Workshop “Recent Trends in Geometric and Nonlinear Analysis”, BIRS, Banff Centre, Canada (Aug. 7, 2012)
- PDE seminar, University of Sydney, Australia (May 28, 2012)
- Workshop “Cocompact Imbeddings, Profile Decompositions, and their Applications to PDE”, TIFR CAM, Bangalore, India (Jan. 6, 2012)
- 2011 Differential geometry seminar, Élie Cartan Institute, Nancy, France (Nov. 29, 2011)
- Workshop “Nonlinear Differential Equations”, Pienza, Italy (Nov. 7, 2011)
- PDE seminar, University of Sydney, Australia (May 9, 2011)
- PDE and analysis seminar, MSI, ANU, Canberra, Australia (Mar. 22, 2011)
- Conference “Nancy Geometric Days”, Élie Cartan Institute, Nancy, France (Jan. 18, 2011)
- 2010 Analysis seminar, Sapienza University of Rome, Italy (Nov. 8, 2010)
- Spectral theory and geometry seminar, Fourier Institute, Grenoble, France (Oct. 14, 2010)
- Joint regional seminar on geometric analysis, CIRM, Marseille, France (Sept. 24, 2010)
- PDE seminar, Brown University, Providence, US (Apr. 30, 2010)
- Geometry and analysis seminar, University of Nice Sophia Antipolis, France (Jan. 7, 2010)
- 2009 Analysis seminar, McGill University, Montreal, Canada (Jul. 13, 2009)
- Conference “Geometric and Nonlinear Analysis”, University of Cergy-Pontoise, France (May 26, 2009)
- AGM-LAGA Meeting, University Paris 13, France (Apr. 6, 2009)
- PDE seminar, University of Rouen, France (Mar. 26, 2009)
- Conference “Geometric Aspects of PDEs”, CIRM, Marseille, France (Mar. 2, 2009)
- PDE seminar, Brown University, Providence, US (Feb. 20, 2009)

### Organization of seminars and conferences

- 2018 Co-organizer of the Geometric and Nonlinear PDEs session at the 12th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Taipei, Taiwan (Jul. 5 – 9, 2018)
- 2018 Co-organizer of a workshop in geometric analysis, CRM, Montréal (Mar. 12 – 16, 2018)
- 2017 Co-organizer of the Nonlinear PDEs session at the Mathematical Congress of the Americas, CRM and McGill University (Jul. 24 – 28, 2017)
- 2015 – Co-organizer of a geometric analysis seminar, McGill University
- 2014 Co-organizer of the conference “Geometric Analysis Meeting in Nice”, in honor of Professor Philippe Delanoë’s 60th birthday, University of Nice Sophia Antipolis (Jun. 2 – 4, 2014)
- 2009 – 2013 Co-organizer of a geometry and analysis seminar, University of Nice Sophia Antipolis

### Research grants

- 2016 – 2021 NSERC Discovery Grant awarded for the project: Existence and non-existence of blowing-up solutions for nonlinear elliptic equations arising in physics and geometry; \$18K per year awarded for a period of five years
- 2015 – 2018 McGill University start-up fund: \$40K awarded for a period of three years
- 2009 – 2012 ANR-Blanc Grant awarded for the project: Concentration Phenomena in Geometric Analysis; €150K awarded to seven researchers from different French universities for a period of three years. This project was coordinated by E. Hebey and F. Pacard.

### Students and postdoctoral researchers supervision

- 2017 – Co-advisor for the Ph.D. thesis of Vladimir Sicca
- 2017 – Co-advisor for the Master’s thesis of Hilton Maurer
- 2017 Co-advisor for the Honours research project (MATH 470) of Edward Chernysh
- 2017 Advisor for the undergraduate Summer research project of Edward Chernysh
- 2017 Co-advisor for the undergraduate Summer research project of Samuel Desrochers
- 2016 – Co-advisor for the postdoctoral position of Rohit Jain
- 2016 Advisor for the undergraduate Summer research project of Edward Chernysh
- 2016 Advisor for the Master’s Summer research project of David Michel, ENS Rennes
- 2015 – Co-advisor for the Ph.D. thesis of Shaodong Wang
- 2015 – 2017 Co-advisor for the postdoctoral position of Xin-Yang Lu

### Committee memberships

- 2017 – 2019 Member of the Committee on Graduate Affairs, Department of Mathematics and Statistics, McGill University
- 2017 – 2018 Chair of the Ph.D. Preliminary Oral Examinations, Department of Mathematics and Statistics, McGill University
- 2016 – 2018 Member of the Nominating and Procedures Committee, Department of Mathematics and Statistics, McGill University
- 2015 – 2017 Member of the Committee on Undergraduate Affairs, Department of Mathematics and Statistics, McGill University
- 2015 Member of the Ph.D. thesis committee for Alexandra Tcheng, McGill University (Sept. 10, 2015)
- 2015 Chair of a Baccalauréat committee (French secondary school diploma), Lycée Parc Impérial, Nice, France (Jul. 6 and 9, 2015)

### Referee activities

I have served as a referee for several peer-reviewed journals including the following:

Advanced Nonlinear Studies, Advances in Differential Equations, Advances in Mathematics, Analysis & PDE, Calculus of Variations and Partial Differential Equations, Duke Mathematical Journal, Indiana University Mathematics Journal, International Mathematics Research Notices, Journal of Differential Equations, Journal of Functional Analysis, Journal of Mathematical Analysis and Applications, Nonlinear Analysis, Pacific Journal of Mathematics, Potential Analysis, Publications Mathématiques de l'IHES

### Teaching experience

#### At McGill University:

- Winter 2018 MATH 455: Honours Analysis 4
- Fall 2017 MATH 242: Analysis 1
- Fall 2016 MATH 254: Honours Analysis 1
- Winter 2016 MATH 249: Honours Complex Variables
- Fall 2015 and 2016 MATH 580: Partial Differential Equations (graduate course)

#### At the University of Nice Sophia Antipolis:

- Winter 2012 to 2015 Applied Quantitative Techniques (main lectures and exercise sessions)
- Winter 2015 Mathematical Modeling (main lectures and exercise sessions)
- Fall 2013 Differential Calculus (exercise sessions)
- Fall 2011 and 2012 Prerequisites in Analysis (main lectures; graduate course)
- Fall 2009 to 2011 Analysis (main lectures and exercise sessions)

Fall 2009 and 2010    Statistics (exercise sessions)

**At the University of Cergy-Pontoise:**

Fall 2008        Variational Methods (exercise sessions)

Fall 2008        Analysis in  $\mathbb{R}^n$  (exercise sessions)

2005 to 2008    Mathematics for Sciences (exercise sessions)

**At the TIFR CAM, Bangalore, India:**

Fall 2012    Series of six lectures on Scalar Curvature-type Equations for graduate students