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Nicolas SAINTIER's Curriculum Vitæ

February 2020

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Assistant Professor at the Mathematics Department, College of Exact Sciences, Buenos Aires University

Under contract with the CONICET as **Assistant Researcher**.

Publications.

[43] J.P. Pinasco, M. Rodriguez Cartabia, N. Saintier, *Evolutionary game theory in mixed strategies: from microscopic interactions to kinetic equations*, submitted.

[42] J.P. Pinasco, N. Saintier, F. Vazquez, *A model for a phase transition between political mono-polarization and bi-polarization*, submitted.

[41] H.T. Banks, J. Catenacci, A. Criner, M. Morvidone, D. Rubio, N. Saintier, *Comparison of methods for the determination of reflective properties of complex composite materials*, submitted,

[40] M. Perez-Llanos, J.P. Pinasco, N. Saintier, *Opinion attractiveness and its effect in opinion formation models*, submitted.

[39] Azmy S. Ackleh, N. Saintier, *Diffusive limit to a selection-mutation equation with small mutation formulated on the space of measures*, submitted.

[38] Azmy S. Ackleh, N. Saintier, *Well-posedness for a system of transport and diffusion equations in measure spaces*, submitted.

[37] J.P. Pinasco, N. Saintier, F. Vazquez, *The role of voting intention in public opinion polarization*, Phys. Rev. E 101, 012101 - Published 2 January 2020.

[36] N. Saintier, L. Véron, *Nonlinear elliptic equations with measure valued absorption potential*, to appear in Annali della Scuola Normale Superiore di Pisa, Classe di Scienze, 49 pp, DOI Number: $10.2422/2036-2145.201803\_007$

[35] Azmy S. Ackleh, R. Lyons, N. Saintier, *Finite Difference Schemes for a Structured Population Model in the Space of Measures*, Mathematical Biosciences and Engineering, 17 (1), 747-775, 2020.

[34] L. Pedraza, J.P. Pinasco, N. Saintier, *Measure-valued opinion dynamics*, M3AS: Mathematical Models and Methods in Applied Sciences, 01(30) 2020.

[33] Azmy S. Ackleh, N. Saintier, J. Skrzeczkowski, *Sensitivity equations for measure-valued solutions to transport Equations*, Mathematical Biosciences and Engineering, 17(2020), 514-537.

[32] M. C. Pereira, J.D. Rossi, N. Saintier, *Fractional problems in thin domains*, Nonlinear Analysis, 193, 2020.

[31] J. Fernandez Bonder, N. Saintier, A. Silva, *The concentration-compactness principle for fractional order Sobolev spaces in unbounded domains and applications to the generalized fractional Brezis-Nirenberg problem*, NoDEA, (2018) 25: 52.

[30] M. Perez-Llanos, J.P. Pinasco, N. Saintier, A. Silva, *Opinion formation models with heterogeneous persuasion and zealotry*, SIAM Journal on Mathematical Analysis 2018, Vol. 50, No. 5, pp. 4812-4837.

[29] J.P. Pinasco, M. Rodriguez Cartabia, N. Saintier, *A game theoretic model of wealth distribution, Dynamic Games and Applications*, 8 (4), 2018, 874-890.

[28] P. Groisman, S. Saglietti, N. Saintier, *Metastability for small random perturbations of a PDE with blow-up*, Stochastic Processes and Applications, 128 (5), 2018, 1558-1589.

[27] I. Caridi, J.P. Pinasco, N. Saintier, P. Schiaffino, *Characterizing Segregation in the Schelling-Voter Model*, Physica A, 487, 2017, 125-142.

[26] N. Saintier, A. Silva, *Local existence conditions for an equations involving the $p(x)$-Laplacian with critical exponent in $\mathbb{R}^N$*, Nonlinear Differential Equations and Applications, 24, 2017.

[25] J. Fernandez Bonder, N. Saintier, A. Silva, *A Gamma convergence approach to the critical Sobolev embedding in variable exponent spaces*, Journal of mathematical analysis and applications, 442 (1), 2016, 189-205.

[24] I. Drelichman, P. De Napoli, N. Saintier, *Weighted embedding theorems for radial Besov and Triebel-Lizorkin spaces*, Studia Mathematica, 3485, 2016, 47-65.

[23] D. Bonheure, J.D. Rossi, N. Saintier, *The limit as $p \to +\infty$ in the eigenvalue problem for a system of p-Laplacians*, Annali di Matematica Pura ed Applicata, 195 (5), 2016, 1771?1785.

[22] L. Del Pezzo, J.D. Rossi, N. Saintier, A. Salort, *An optimal mass transport approach for limits of eigenvalue problems for the fractional p-Laplacian*, Advances in Nonlinear Analysis, 4 (3), 2015, 235-249.

[21] H.T. Banks, D. Rubio, N. Saintier, M. I. Troparevsky, *Optimal design for parameter estimation in EEG problems in 3D multilayered domain*, Mathematical Biosciences and Engineering, 12 (4), 2015, 739-760.

[20] J.D. Rossi, N.Saintier, *The limit as $p \to +\infty$ of the first eigenvalue for the p-Laplacian with mixed Dirichlet and Robin boundary conditions*, Nonlinear Analysis Series A: Theory, Methods and Applications, 119, 2015,167-178.

[19] J. Fernandez Bonder, N. Saintier, A. Silva, *Existence of solution to a critical trace equation with variable exponent*, Asymptotic Analysis, 93 (1-2), 2015, 161-185.

[18] E. Parini, N. Saintier, *Shape derivative of the Cheeger constant*, ESAIM:COCV, 21 (2), 2015, 348-358.

[17] J.D. Rossi, N.Saintier, *On the first nontrivial eigenvalue of the ∞-Laplacian with Neumann boundary conditions*, Houston Journal of Mathematics, 42 (2), 2016, 613-635.

[16] J. Fernandez Bonder, N. Saintier, A. Silva, *On the Sobolev trace Theorem for variable exponent spaces in the critical range*, Anali di Matematica Pura ed Aplicata, 193 (6), 2014, 1607-1628.

[15] J.C. Navarro, J.D. Rossi, N.Saintier, A. San Antolin, *The dependence of the 1st eigenvalue of the ∞-Laplacian with respect to the domain*, Glasgow Mathematical Journal. 56 (2), 2014, 241-249.

[14] J. Fernandez Bonder, N. Saintier, A. Silva, *On the Sobolev embedding theorem for variable exponent spaces in the critical range*, Journal of Differential Equations, 253 (5), 2012, 1604-1620.

[13] J. Fernandez Bonder, N. Saintier, A. Silva, *Existence of solution to a critical equation with variable exponent*, Ann. Acad. Sci. Fenn. Math., 37, 2012, 579-594.

[12] M. I. Troparevsky, D. Rubio, N. Saintier, *Sensitivity analysis for the EEG forward problem*, Frontiers in computational neuroscience, 4, 2010, 1-6.

[11] N. Saintier, *Best constant in critical Sobolev inequalities of second-order in the presence of symmetries*, Nonlinear Analysis TMA, 72 (2), 2010, 689-703.

[10] N. Saintier, *Asymptotic in Sobolev spaces for symmetric Paneitz-type equations on Riemannian manifolds*, Calculus of Variations and Partial Differential Equations, 35, 2009, 385-407.

[9] N. Saintier, *Asymptotic of best Sobolev constants on thin manifolds*,
Journal of differential equations, 246, 2009, 2876-2890.

[8] N. Saintier, *Estimates of the best Sobolev constant of the embedding of $BV(\Omega)$ into $L^1(\partial\Omega)$ and related shape optimization problems*, Nonlinear Analysis TMA, 69,2008, 2479-2491.

[7] N. Saintier, *Blow-up theory for symmetric critical equations involving the p-Laplacian*,
Nonlinear Differential Equations and Applications, 15 (1-2), 2008, 227-245.

[6] N. Saintier, *General Stochastic target problem with mixed diffusion and application to hedging problem for large investor*, Electronic Communications in Probability, 12, 2007, 106-119.

[5] J. Fernández Bonder, N. Saintier, *Estimates for the Sobolev trace constant with critical exponent and applications*, Annali di Matematica Pura ed Applicata, 187 (2008), no. 4, 683–704.

[4] N. Saintier, *Schauder estimates for degenerate elliptic and parabolic equations in $\mathbb{R}^n$ with Lipschitz drift*, Differential and Integral Equations, 20 (4), 2007, 397-428.

[3] E.Hebey, N. Saintier, *Stability and perturbations of the domain for the first eigenvalue of the 1-laplacian*, Archiv der Mathematik, 86, (4), 2006, 340-351.

[2] N. Saintier, *Changing sign solutions of a conformally invariant fourth order equation in the Euclidean space*, Communications in Analysis and Geometry, 14 (4), 2006, 613-624.

[1] N. Saintier, *Asymptotic estimates and blow-up theory for critical equations involving the p-laplacian*, Calculus of Variations and Partial Differential Equations, 25 (3), 2006, 299-331.

Talks

- *Measure-valued solutions for some problems arising in social sciences*, charla dada en el seminario de analisis - University of Parma (Italy) - 03/10/2019.
- *Measure-valued solutions for some problems arising in social sciences*, charla dada en el seminario de analisis - University of Bologna (Italy) - 26/09/2019.
- Posters
  - "Nonlocal kinetic equations and their long time behavior" Juan Pablo Pinasco, Mayte Perez-Llano, Nicolas Saintier
  - "A SIS model with propagation of conducts" with Juan Pablo Pinasco, Carlo Ferrari, Natalia Kontorovich, Nicolas Saintier

  at the "27th International Conference on Statistical Physics, StatPhys 27" - Buenos Aires from the 08th to 12th of August 2019.
- *Measure-valued solutions for some problems arising in social sciences*, invited talk at the "Mathematical encounters" - Instituto Argentino de Matemática - Buenos Aires (Argentina) 26/03/2019.
- *Measure-valued solutions for some problems arising in biology and social sciences*, charla invitada dada en el Workshop 'Mathematical Modeling with Measures: Where Applications, Probability and Determinism Meet' - Leiden (Holland) 3-7 December 2018.
- *Measure-valued solutions for some problems arising in biology and social sciences*, charla dada en el "V International Conference on Applied Mathematics, Design and Control", Buenos Aires 7-9/11/2018.
- *Nonlinear elliptic equations with measure valued absorption potential*, seminario di Analisi Matematica de la Universia di Parma (Italia) - 6/07/2018.
- *Algunas herramientas matematicas para modelar el proceso de formación de opinión*, Math dpt seminar of the Univ. Di Tella (Buenos Aires) - 10/05/2018.
- *Nonlinear elliptic equations with measure valued absorption potential*, Analysis semianr of the Maths dpt of the FCEyN-UBA - 10/05/2018.
- *Nonlinear elliptic equations with measure valued absorption potential*, invited talk at the "South American Workshop on Integral and Differential Equations", 26-28/02/2018, University of San Pablo, Brasil.
- *Opinion formation model with stubborn agents*, invited plenary talk at the "XI Americas Conference on Differential Equations and Nonlinear Analysis", 15-19/08/2017, University of Alberta, Edmonton, Canada.
- *Inverse problems for random dfferential equations*, talk given at the "'VI MACI 2017"' in Comodoro Rivadavia (Argentina), 04/05/2017.

- *Modelo de formación de opinión con agentes testarudos*, Math dp seminar of the National University of San Luis (Argentina), 22/03/2017.
- *EDP en ciencias sociales*, invited talk at the "Segundas Jornadas de Investigación y Difusión" of IMAS-DM, FCEyN-UBA - 30/11/2016.
- *Ecuaciones críticas con el $p(x)$-Laplaciano en $\mathbb{R}^n$*, XIII Encuentro Nacional de Analistas A.P.Calderón, Villa Gral Belgrano (Argentina), 15/04/2016.
- *On the first eigenvalue of the p-Laplacian when $p \to +\infty$*, talk given at the "X Americas Conference on Differential Equations and Nonlinear Analysis", 19/02/2015, Buenos Aires, Argentina.
- *Sobre el límite cuando $p \to +\infty$ del 1er autovalor del p-Laplaciano con varias condiciones de borde*, talk given at the Annual gathering of the "Unión Matemática Argentina", National University of San Luis (Argentina), 19/09/2014.
- *Sobre el límite cuando $p \to +\infty$ del 1er autovalor del p-Laplaciano con varias condiciones de borde*, XII Encuentro Nacional de Analistas A.P.Calderón, Villa Gral Belgrano (Argentina), 8 de agosto de 2014.
- *On the first nontrivial eigenvalue of the ∞-Laplacian with Neumann boundary conditions*, invited talk in the session "Local and non-local evolution problems" of the "Mathematical Congress of the Americas", Guanajuato (México),5-9/08/2013.
- *Ecuaciones críticas con el $p(x)$-Laplaciano*, invited talk at the "'IV Congreso Latinoamericano de Matematicos (CLAM)"', Córdoba (Argentina), 06/08/2012.
- *Ecuaciones críticas con el $p(x)$-Laplaciano*, invited talk at the "'Jornada de análisis, EDP y matemática aplicada"', Instituo Argentino de Matemática, Buenos Aires, 28/06/2012.
- *Critical equations with $p(x)$-Laplacian*, invited plenary talk at the "IX Americas conference on Differential Equatins", Trujillo (Perú), 13/01/2012.
- *Equations elliptiques avec exposant de Sobolev critique en présence de symétrie*, Seminario de análisis, Univ. Paris-Dauphine (Francia), 22/11/11.
- *Ecuaciones elípticas en presencia de simetría sobre variedades compactas*, 2ndo Workshop Ecuaciones de la Física matemática, Universidad Nacional Gral Sarmiento (Buenos Aires Argentina) - 25 de Noviembre 2010.
- *Comportamiento asintótico y multiplicidad para ecuaciones singularmente perturbadas con simetría*, invited talk in the "Ecuaciones" session of the Anual gathering of the "Unión Matemática Argentina", Tandíl (Argentina), 01/10/2010.
- *Algunos comentarios sobre distribuciones óptima de observaciones para estimación de parámetros*, talk given at the "II MACI-ASAMACI", Austral University, Rosario (Argentina), 14/12/2009.
- *Simetría en las ecuaciones críticas*, talk given in the "Ecuaciones" session of the Anual gathering of the "Unión Matemática Argentina", National University of Cuyo, Mendoza, 25-27/09/08.

- *Asymptotic in Sobolev spaces for symmetric critical fourth-order equations on manifolds*, talk given in the *VII workshop On Nonlinear Differential Equations*, University PUC, 15/09/08-19/09/08 Rio de Janeiro (Brasil)

- *Simetría en las ecuaciones críticas*, talk given in the PDE Seminar of the Math dpt FCEyN-UBA, Argentina, 11/2007.

- *Shape optimization for a critical Steklov eigenvalue problem with the p-laplacian in domains with holes*, talk given in the "Primer Encuentro Nacional de Ecuaciones Differenciales ENED", La Falda - Córdoba (Argentina), 11/2006.

- *Stability of the first eigenvalue of the* 1*-Laplacian*, talk given in the PDE seminar of the Math dpt of the FCEyN-UBA - Argentina 09/2006.

- *Stability of the first eigenvalue of the* 1*-Laplacian*, talk given in the Congress "Mathematics and its Applications" (session "Geometric Analysis"), Torino (Italy), july 2006.

- *Stability of the first eigenvalue of the* 1*-Laplacian*, talk given in the Differential Geometry seminar, Institut Elie Cartan (Nancy - France), 2006.

- *Stability of the first eigenvalue of the* 1*-Laplacian*, talk given in the Analysis Seminar, University of Parma (Italy), 2006.

- *Stability of the first eigenvalue of the* 1*-Laplacian*, talk given in the PDE Seminar, Universidad Autónoma de Madrid (España), 2006.

- *Stability of the first eigenvalue of the* 1*-Laplacian*, talk given in the PDE Seminar, University de Savoie, Chambéry (France), 2006.

Teaching

Graduate courses

In the Math dpt of College of exact and natural sciences FCEyN of the Univ. Buenos Aires:

- Game theory (2017) - The course covered all the basic of game theory (combinatorial games, games in normal and extensive form, existence of Nash equilibria) and some more advanced topics (evolutionnary game theory, auctions, price of anarchy in routing games) - The course was attended by graduate and undergraduate students.
- Optimal Transport (2014) - course mainly based on C. Villani's book "Topics on optimal transport theory". It colvers all the basic of optimal transport theory for the quadratic cost, Wasserstein distance, formulation of certain pde as gradient flows in Wasserstein space following Jordan-Kinderlehrer-Otto's paper, concentration of measure phenomenon and log-Soolev inequality.
- Non-linear Differential Equations (1st semester of 2013 and 2nd of 2016). The course covers all the basic tools to study non-linear elliptic equations: maximum principle, regularity theory, variational and non-variational methods, the concentration-compactness principle.

Mini-course of 8h about Cucker-Smale model of flocking, opinion formation models and mean-field limit - National University of San Luis - 20-23/03/2017.

Undergraduate courses

- In the Math dpt of the College of Exact and Natural Sciences FCEyN of the Univ. Buenos Aires:
  - Algebra I - 1st sem. 2019 (theory) - divisibility for integer numbers and polynoms.
  - Analisis I - 2nd sem. 2008 (exercises), 1st and 2nd sem. 2009, summer 2011, 2nd sem. 2018 (theory) - differential calculus in many variables and Riemann integral in one variable.
  - Complex Analysis - 1st sem. 2011 (exercises), 2nd sem. 2017 (theory) - complex analysis from scratch up to sequences and series of holomorphic and meromorphic functions, infinite products, Riemann theorem, proof of the prime number theorem.
  - Differential Equations - 1st sem.. 2010 (theory y exercises), 1st sem.. 2013 (theory) - classical theory for Laplace, heat, transport and wave equations following the first four chapter of L. Evans book, Sobolev spaces and weak formulation of linear elliptic PDEs.
  - Numerical Calculus - 2nd sem. 2007 (exercises), 1st sem. 2019 (exercises) - one-step methods for odes, resolution of linear systems, Newton method, interpolation, least-square minimization, numerical integration both from theoretical and implemetation point of view.
  - Mathematics 4 (for physic students)- 1st sem.. de 2012 (theory y exercises), 2nd sem. 2014 (theory), 1st sem.. 2015 (theory y exercises), 2nd sem. 2016 (theory), 1st sem. 2019 (theory) - Complex analysis up to Residue theorem, Fourier series and transform, Laplace transform, applications to the resolution of some pdes.
  - probability and statistic (for computation students) - 2nd sem. 2018 (theory), 1st sem.. 2008 (exercises) - probability from scratch up to the central limit theorem, statistics from scratch up to confidence interval, punctual estimation, hypothesis test.

- At the "Instituto de ciencias" of the National Univ. of Gral Sarmiento:
  - Introduction to mathematics - 2nd sem. 2013.
  - Differential Equations - 2nd sem. 2012 (theory y exercises), 1st sem.. 2013 (theory)
  - mathematics IV - 1st sem.. de 2008 a 2012 y 2nd sem. 2012 (theory y exercises)
  - probability and statistics - 2nd sem. de 2008 a 2011, 1st sem.. 2014 (theory y exercises)
- At the Maths dpt of San Andres University (Argentina)
  - Statistics 1 (exercises)
  - Mathematics 2 (exercises)
- At the Maths dpt of the university of Cergy-Pontoise (Francia):
  - Analysis 1 (for biology students) (exercises)
  - Analysis 2 (exercises)
  - Numerical Analysis (exercises)
- At the Maths dpt of the university Paris 6 (France):
  - analysis 1 (exercises)
  - analysis 2 (exercises)
  - algebra 1 (exercises)

Referee for the following journals (number of refereed papers in parenthesis)

- "'Advances in pure and applied mathematics"' (1)
- "'Afrika Matematika"' (1)
- "'Annali dell'Universitá di Ferrara"' (1)
- "'Boundary value problems"' (2)
- "'Calculus of Variations and PDE"' (1)
- "'Canadian Applied Mathematics Quarterly"'
- "'Cogent Mathematics"' (1)
- "'Communications on Pure and Applied Analysis"'
- "'Complex Variables and Elliptic Equations"' (1)
- "'Finance and Stochastics"' (1)
- "'Journal of Mathematical Analysis and Applications"' (1)
- "'Mathematical Biosciences and Enginneering"' (1)
- "'Manuscripta mathematica"' (1)
- "'Mathematische Nachrichten"' (1)
- "'Nonlinear Analysis TMA"' (3)
- "'Physica D"' (1)
- "'Proceedings A of the Royal Society of Edinburgh"' (1)
- "'Revista de la unión matematica Argentina"' (2)
- "'SIAM Journal on Control and Optimization"' (1)
- "'Studies in mathematical sciences"' (1)
- "' Systems and Control Letters"' (1)
- "'Topological Methods in Nonlinear Analysis"' (2)
- "'Revista de Ciencias de la FCEyN de la Universidad del Valle (Colombia)"' (2)

Reviewer para *Mathematical Reviews* de la American Mathematical Society.