

CURRICULUM VITAE

VICENT CASELLES COSTA

PERSONAL

Date and place of birth: 10-08-60, Gata (Alacant).

Address: Departament de Tecnologia, Universitat Pompeu Fabra, Passeig de Circumvalació, 8, 08003, Barcelona

Phone: 93-542 24 21

Bitnet: vicent.caselles@upf.edu

EDUCATION

1977-78 - 1981-82: Licenciatura in Mathematics, University of València.

1982-83 - 1985: Ph. Mathematics (23-09-85), University of València.

PRESENT RESEARCH INTERESTS

- Image processing
- Partial Differential Equations and their applications
- Differential geometry and its applications
- Computer vision

PREVIOUS RESEARCH INTERESTS

- Functional Analysis: geometry of Banach spaces and operator theory.

EXPERIENCE

- 01-10-86 - 30-09-89:** Ayudante LRU, Facultat de Matemàtiques, University of València
- 01-10-89 - 30-09-90:** ATER, Faculté de Mathematiques, Université de Franche-Comté, Besancon.
- 01-10-90 - 15-10-92:** TU (interino), Departament de Matemàtiques i Informàtica, Universitat de les Illes Balears, Palma (Balears).
- 16-10-92 - 26-06-94:** CEU (Ciencias de la Computación), Departament de Matemàtiques i Informàtica, Universitat de les Illes Balears, Palma (Balears).
- 27-06-94 - 24-09-99:** TU (Applied Mathematics), Departament de Matemàtiques i Informàtica, Universitat de les Illes Balears, Palma (Balears).
- 25-09-99 - 27-05-02** TU (Applied Mathematics), Departament de Tecnologia, Universitat Pompeu Fabra (Barcelona).
- 28-05-02 - Present:** CU (Applied Mathematics), Departament de Tecnologia, Universitat Pompeu Fabra (Barcelona).

LONG TERM VISITS

- 1985 - 1987:** Mathematisches Institut der Universitaet Tuebingen, Germany.
- 1987 - 1988:** Faculté de Mathematiques, Université de Franche-Comté, Besancon.
- 1989 - 1990:** Faculté de Mathematiques, Université de Franche-Comté, Besancon.
- 1991 - 1992:** Ceremade, Université de Paris-Dauphine, Paris, France.

SHORT TERM VISITS

- 1993 (2 and 1/2 months):** UCLA, Los Angeles, USA.
- 1994 (2 months):** Faculté de Mathematiques, Université de Franche-Comté, Besancon.

1995-96 (1 month): Ceremade, Université de Paris-Dauphine, Paris, France.
1996-97 (1 month): Ceremade, Université de Paris-Dauphine, Paris, France.
1997-98 (1 month): Ceremade, Université de Paris-Dauphine, Paris, France.
1997-98 (2 months): ENS Cachan, Cachan, France.
1998-99 (1 month): Institut Henri Poincaré, Université Paris-VI, Paris, France.
1999-2000 (1 month): ENS Cachan, Cachan, France.
2000-2001 (1 month): ENS Cachan, Cachan, France.
2001-2002 (2 month): ENS Cachan, Cachan, France.
2002-2003 (1 month): ENS Cachan, Cachan, France.
2003-2004 (1 month): ENS Cachan, Cachan, France.
2004-2005 (1 month): ENS Cachan, Cachan, France.
2005-2006 (1 month): ENS Cachan, Cachan, France.
2006-2007 (1 month): ENS Cachan, Cachan, France.

HONORS

1983: Tercer Premio Nacional Terminación de Carrera (Mathematics).
1983: Premio Extraordinario Fin de Carrera, University of València.
1986: Premio Extraordinario de Doctorado, University of València.
1983-84 to 1986-87: FPI Fellowship, Spanish Ministry of Education.
2002: Distinció de la Generalitat de Catalunya per a la recerca. From October 2002 to September 2006.
2003: Ferran Sunyer i Balaguer Prize.

2006: Invited Conference at the International Congress of Mathematicians, Madrid, Spain.

2008: SIAM Outstanding Paper Prize 2008.

2009: ICREA Acadèmia prize for excellence in research, funded by Generalitat de Catalunya.

2011: Invited plenary speaker at the 7th International Congress on Industrial and Applied Mathematics, July 18-22, 2011, Vancouver, Canada.

2011: 'Test of Time' Award at International Conference on Computer Vision (ICCV) for the ICCV paper 'Geodesic Active Contours' in collaboration with R. Kimmel and G. Sapiro.

2012: SIAM Activity Group on Imaging Science (SIAG/IS) prize for the PAMI paper "A Perceptually Inspired Variational Framework for Color Enhancement".

2012 : Invited lecture at the "6th European Congress of Mathematics", July 2012, Krakow (Poland).

2012 : ERC Grant (Grant agreement No. 319899). Project: INPAINTING: Inpainting Tools for Video Post-production. Variational Theory and Fast Algorithms.

PARTICIPATION IN SCIENTIFIC SOCIETIES

1. From September 1996 to September 1999, Member of the direction committee of the Spanish Society on Applied Mathematics (SEMA).
2. Member of IEEE.

PUBLICATIONS

Books

1. F. Andreu, V. Caselles, J.M. Mazón, "Parabolic Quasilinear Equations Minimizing Linear Growth Functionals". Progress in Mathematics 223, Birkhauser Verlag, 2004. Ferran Sunyer i Balaguer Prize, 2003.

2. M. Bernot, V. Caselles, J.M. Morel. "Optimal Transportation Networks. Models and Theory". Lecture Notes in Mathematics 1955, Springer Verlag, 2009.
3. V. Caselles and P. Monasse, "Geometric Description of Topographic Maps and Applications to Image Processing". Lecture Notes in Mathematics 1984, Springer Verlag, 2010.

International Journals

1. V. Caselles, "A characterization of weakly sequentially complete Banach lattices", *Math. Zeitschrift* 190, 379-385, 1985.
2. V. Caselles, "On irreducible operators in Banach lattices", *Proc. Nether. Acad. Sci.(Indag. Math.)* 89, 11-16, 1986.
3. V. Caselles, "On the peripheral spectrum of positive operators", *Israel J. Math.* 58, 144-160, 1987.
4. V. Caselles, "An extension of Ando-Kriegers theorem to ordered Banach spaces", *Proc. Amer. Math. Soc.* 103, 1070-1072, 1988.
5. V. Caselles, "A short proof of the equivalence of KMP and RNP in Banach lattices and preduals of von Neumann algebras", *Proc. Amer. Math. Soc.* 102, 973-974, 1988.
6. V. Caselles, "Dunford-Pettis operators and the Radon-Nikodym property", *Arch. Math.* 50, 183-188, 1988.
7. V. Caselles, " On Band-Irreducible Operators on Banach Lattices", *Quaest. Math.* 10, 339-350, 1987.
8. V. Caselles, "A characterization of dual Banach lattices", *Proc. Nether. Acad. Sci. (Indag. Math.) Ser. A* 92, 35-47, 1989.
9. V. Caselles and Ch. Klaiany "Existence, uniqueness and regularity of Kruzkovs solutions for the Burger- Carlemans system", *Ann. Fac. Sci. Toulouse*, vol X, 93-104, 1989.

10. F. Andreu, V. Caselles, J. Martínez, J.M. Mazón, "The essential spectrum of AM -compact operators", *Proc. Nether. Acad. Sci.(Indag. Math.) Ser.A.* 2,149-158, 1991.
11. F. Aràndiga, V. Caselles. "Approximations of positive operators and continuity of the spectral radius I". *J. Operator Theory* 26, 53-71, 1991.
12. F. Aràndiga, V. Caselles, "Approximations of positive operators and continuity of the spectral radius II", *Math. Zeits.* 209, 547-558, 1992.
13. F. Aràndiga, V. Caselles, "Approximations of positive operators and continuity of the spectral radius III. *J. Austr. Math Soc.(Ser. A)* 57,330-340, 1994.
14. F. Aràndiga, V. Caselles, "On strongly stable approximations", *Rev. Matemática de la Univ. Complutense* 7,207-217, 1994.
15. V. Caselles. "Duality and nonlinear equations governed by accretive operators". *Pitman Research Notes Series* 208, 39-49, 1989.
16. V. Caselles, "Hamilton-Jacobi equations and scalar conservation laws in one space variable", *J. Nonlinear Anal. TMA.* 18, 461-469, 1992.
17. V. Caselles, M. Mokhtar-Kharroubi, "Approximation of the leading eigenelements for a class of transport equations", *Trans. Th. and Stat. Physics*, 23(4), 501-516, 1994.
18. V. Caselles, F. Catté, B. Coll, F. Dibos, "A geometric model for active contours in image processing", *Num. Mathematik* 66, 1-31, 1993.
19. A. Martinez-Chaparro, P. Salvador, A. Mir, B. Coll, V. Caselles, "Photoelectrochemical imaging at the GaAs/Si (001) - Liquid Junction", *Inst. of Physics Conf. Ser.* 135, 263-266, 1994.
20. A. Martinez-Chaparro, P. Salvador, A. Taberero, R. Navarro, B. Coll, V. Caselles, "Charge recombination imaging at the WSe₂/I- Interface", *Surface Science* 295, 457-461, 1993.
21. C. Ballester, V. Caselles, M. González, "Affine invariant segmentation by variational method", *SIAM J. Appl. Math.* 56, 294-325, 1996.

22. V. Caselles, C. Sbert, “What is the best causal scale space for 3D images?”, *SIAM J. Applied Math.* 56, 1199-1246, 1996.
23. F. Aràndiga, V. Caselles “Multiresolution Approach to the Approximation of the Leading Eigenlements of some Neutron Transport Operators”, *Trans. Th. and Stat. Physics* 25(2), 121-149, 1996.
24. V. Caselles, B. Coll and J.M. Morel, “ A Kanizsa Programme”, *Progress in Nonlinear Differential Equs. and their Applications*, 25, 35-55, 1996.
25. V. Caselles, B. Coll “Snakes in movement”. *SIAM J. Numer. Anal.* 33, 2445 - 2456, 1997.
26. V. Caselles, G. Sapiro, “Histogram Modification via Partial Differential Equations”, *J. Diff. Equations* 135, 238- 268, 1997.
27. V. Caselles, R. Kimmel, G. Sapiro, “Geodesic Active Contours”, *Inter. Journal Computer Vision*, 22(1), 61-79, 1997.
28. V. Caselles, R. Kimmel, G. Sapiro, C. Sbert, “Minimal Surfaces: A Three Dimensional Segmentation Approach” *Numerische Mathematik*, 77, no 4, pp. 423-451, 1997.
29. V. Caselles, R. Kimmel, G. Sapiro, C. Sbert, “Minimal Surfaces Based Object Segmentation”, *IEEE Trans. Pattern Analysis Machine Intelligence*, 19(4), 394-398, 1997.
30. G. Garcia-Belmonte, J. Bisquert and V. Caselles, “The small signal a.c. impedance of a short p-n junction diode”, *Solid State Electronics*, 42(6), 939-941, 1998.
31. C. Ballester, V. Caselles, M. González “Lower Semicontinuity of the Affine Total Variation used in Image Segmentation”, *Rev. Union. Mat. Argentina (N dedicado a J. Bouillet)*, vol. 41(1), 41-60, 1999.
32. V. Caselles, J.M. Morel, C. Sbert, “An Axiomatic Approach to Image Interpolation”, *IEEE Trans. Image Processing*, vol. 7, No. 3, pp. 376-386, 1998.
33. G. Sapiro and V. Caselles, “Contrast enhancement via image evolution flows,” *Graphical Models and Image Processing*, 59(6), 407-416, 1997.

34. V. Caselles, J.M. Morel, G. Sapiro and A. Tannenbaum, "Introduction to the special issue on partial differential equations and geometry-driven diffusion in image processing and analysis" *IEEE Trans. Image Processing*, vol. 7, No. 3, pp. 269-273, 1998.
35. V. Caselles, J.L. Lisani, J.M. Morel and G. Sapiro, "Shape Preserving Local Histogram Modification," *IEEE Transactions on Image Processing*, vol. 8 (2), pp. 220-230, 1999.
36. V. Caselles, B. Coll and J.M. Morel, "Topographic maps and Local Contrast Changes in Natural Images", *Int. J. Computer Vision*, 33(1), pp. 5-27, 1999.
37. V. Caselles, B. Coll and J.M. Morel, "Un model matemàtic per a l'anàlisi d'imatges", *Butlletí de la Societat Catalana de Matemàtiques*, 14(1), pp. 63-83, 1999.
38. F. Andreu, C. Ballester, V. Caselles and J.M. Mazon, "Minimizing Total variation Flow", *Differential and Integral Equations*, vol. 4(3), pp. 321-360, 2001.
39. V. Caselles, G. Sapiro and B. Tang, "Diffusion of general data on non-flat manifolds via harmonic maps theory: The direction diffusion case", *Int. J. Computer Vision*, 36(2), pp. 149-161, February 2000.
40. V. Caselles, G. Sapiro and D.H. Chung, "Vector Median Filters, Vector Morphology, and Coupled PDE's: Theoretical Connections," *Journal of Mathematical Imaging and Vision*, 12, pp. 109-120 (2000).
41. L. Ambrosio, V. Caselles, S. Masnou and J.M. Morel, "The Connected Components of Sets of Finite Perimeter," *European Journal of Mathematics*, 3, pp. 39-92, 2001.
42. F. Andreu, C. Ballester, V. Caselles and J.M. Mazon, "The Dirichlet Problem for the Minimizing Total Variation Flow," *Journal Functional Analysis*, 180, pp. 347-403, 2001.
43. F. Andreu, V. Caselles and J.M. Mazon, "A Parabolic Quasilinear Problem for Linear Growth Functionals," *Revista Matemàtica Iberoamericana*, vol. 18(1), pp. 135-185, 2002.

44. F. Andreu, C. Ballester, V. Caselles and J.M. Mazon, "Minimizing Total Variation Flow," *Comptes Rendus Acad. Sciences*, t. 311, I, pp. 867-972, 2000.
45. C. Ballester, M. Bertalmio, V. Caselles, G. Sapiro and J. Verdera, "Filling-In by Joint Interpolation of Vector Fields and Grey Levels ," *IEEE Transactions on Image Processing*, vol. 10(8), pp. 1200-1211, 2001.
46. V. Caselles, B. Coll and J-M. Morel, "Geometry and Color in Natural Images," *Journal of Mathematical Imaging and Vision*, vol. 16, pp. 89-107, 2002.
47. C. Ballester, V. Caselles, "The M-components of level sets of continuous functions in WBV," *Publicacions Matemàtiques*, vol. 45, pp. 477-527, 2001.
48. V. Caselles, G. Sapiro and B. Tang, "Color Image Enhancement via Chromaticity Diffusion". *IEEE Transactions on Image Processing.*, vol. 10(5), pp. 701-707, 2001.
49. F. Andreu-Vaillo, V. Caselles and J.M. Mazón, "Existence and Uniqueness of solutions for a Parabolic Quasilinear Problem for Linear Growth Functionals with L^1 data," *Mathematisches Annalen*, vol. 322, pp. 139-206, 2002.
50. F. Andreu, V. Caselles, J.I. Díaz and J.M. Mazón, "Some Qualitative Properties of the Total Variation Flow", *Journal Functional Analysis* 188, pp. 516-547, 2002.
51. G. Bellettini, V. Caselles and M. Novaga, "The Total Variation Flow in \mathbb{R}^N ". *J. Diff. Equations*, 184, pp. 475-525, 2002.
52. V. Caselles and J.M. Morel, "Irrigation". *Progress in Nonlinear Differential Equations and their Applications*, vol. 51, pp. 81-90, Birkhauser, 2002. Editors: F. Tomarelli and G. Dal Maso. *VARMET 2001. Trieste, June, 2001.*
53. V. Caselles and P. Monasse, "Grain Filters", *Journal of Mathematical Imaging and Vision*, 17, pp. 249-270, 2002.
54. C. Ballester, V. Caselles and P. Monasse, "The tree of shapes of an image," *ESAIM: Control, Optimisation and Calculus of Variations*, 9, pp. 1-18, 2003.

55. M. Bertalmio, V. Caselles, B. Rougé and A. Solé, “Total Variation Image Restoration with Local Constraints”. *Journal of Scientific Computing*, vol. 19, no. 1-3, pp. 95-122, December 2003.
56. F. Andreu, V. Caselles and J.M. Mazón, “The Cauchy Problem for Linear Growth Functionals”. *Journal of Evolution Equations* 3, pp. 39-65, 2003.
57. A. Solé, V. Caselles, G. Sapiro, and F. Arándiga, “Morse Description and Geometric Encoding of Digital Elevation Maps”. *Free Boundary Problems* (Trento, June, 5-8, 2002). International Series of Numerical Mathematics, Vol. 147, pp. 303-312, Birkhauser 2003.
58. C. Ballester, V. Caselles, B. Rougé et J. Verdera, Une méthode géométrique de fusion pour des images P+XS. *Bulletin de la Société Française de Photogrammétrie et Teledetection*, Num. 169, pp. 53-63, 2003.
59. F. Andreu, V. Caselles, J.M. Mazón, and S. Moll, “The minimizing Total Variation flow with measure initial conditions”. *Communications in Contemporary Mathematics*, vol. 6, no. 3, pp. 431-494, 2004.
60. C. Ballester, V. Caselles and J. Verdera, “Disocclusion by Joint Interpolation of Vector Fields and Gray Levels”. *SIAM Journal on Multiscale Modeling and Simulation*, vol. 2 , no. 1, pp. 80-123, 2003.
61. V. Caselles, G. Sapiro, A. Solé, and C. Ballester, “Morse Description and Morphological Encoding of Continuous Data”. *SIAM Journal on Multiscale Modeling and Simulation* vol. 2, num. 2, pp. 179-209, 2004.
62. V. Caselles, G. Sapiro, A. Solé, and F. Arándiga “Morse Description and Geometric Encoding of Continuous Data with an Application to the Encoding of Digital Elevation Maps”. *IEEE Transactions on Image Processing*, vol. 13, no. 9, pp. 1245-1262, 2004.
63. F. Andreu, V. Caselles, and J.M. Mazón, “A Strongly Degenerate Quasilinear Equation: the Elliptic Case”. *Annali della Scuola Normale Superiore di Pisa Cl Sci.* (5), vol. III, pp. 555-587 (2004).

64. G. Bellettini, V. Caselles and M. Novaga, “Explicit solutions of the eigenvalue problem $-\operatorname{div}\left(\frac{Du}{|Du|}\right) = u$ ”. *SIAM Journal on Mathematical Analysis*, 36, no. 4, pp. 1095–1129, 2005.
65. F. Alter, V. Caselles and A. Chambolle, “Evolution of Characteristic Functions of Convex Sets in the Plane by the Minimizing Total Variation Flow”. *Interfaces and Free Boundaries* 7, pp. 29-53, 2005.
66. M. Bernot, V. Caselles and J.M. Morel, “Are there infinite irrigation trees ?”. *Journal of Mathematical Fluid mechanics*, 8 (3), pp 311-332, August 2006.
67. V. Caselles, R. Kimmel ad G. Sapiro, “Geometric Active Contours and Surfaces for Image Segmentation”. *Handbook of Image Processing*, pp. 613-627, 2005.
68. F. Andreu, V. Caselles, and J.M. Mazón, “A Strongly Degenerate Quasilinear Equation: the Parabolic Case”. *Archive for Rational Mathematics and Mechanics*, 176 (2005), no. 3, 415–453.
69. F. Andreu, V. Caselles, and J.M. Mazón, “A Strongly Degenerate Quasilinear Elliptic Equation”. *Nonlinear Analysis, TMA*, 61, pp. 637-669, 2005.
70. F. Andreu, V. Caselles, and J.M. Mazón, “The Cauchy Problem for a Strongly Degenerate Quasilinear Equation”. *Journal European Math. Society (JEMS)* 7 (no. 3), 361–393, 2005.
71. M. Bertalmío, V. Caselles, G. Haro, and G. Sapiro, “PDE-Based Image and Surface Inpainting”. To appear in *Mathematical Models of Computer Vision: The Handbook*. Nikos Paragios, Yunmei Chen and Olivier Faugeras, editors.
72. F. Alter, V. Caselles and A. Chambolle, “A characterization of Convex Calibrable Sets in \mathbb{R}^N ”. *Mathematische Annalen* 332, pp. 329-366, 2005.
73. G. Bellettini, V. Caselles, A. Chambolle and M. Novaga, “Crystalline mean curvature evolution of convex sets.” *Archive for Rational Mathematics and Mechanics* 179, (2006), no. 1, 109–152.
74. M. Bernot, V. Caselles and J.M. Morel, “Traffic plans”. *Publicacions Matemàtiques* 49, pp. 417–451, 2005.

75. M. Bertalmío, G. Haro, and V. Caselles, “Day for night”. *International Journal of Computer Vision*, 69 (1), pp. 109-117, August 2006.
76. V. Caselles, L. Igual and O. Sander, “An Axiomatic Approach to Scalar Data Interpolation on Surfaces”. *Numerische Mathematik*, 102 (2006), no. 3, 383–411.
77. V. Caselles and A. Chambolle, “Anisotropic curvature-driven flow of convex sets”. *Nonlinear Analysis, TMA*. 65 (8), pp. 1547-1577, October 2006.
78. C. Ballester, V. Caselles, L. Igual, J. Verdera, and B. Rougé, “A Variational Model for P+XS Image Fusion ”, *International Journal of Computer Vision* 69 (1), pp 43-58, August 2006.
79. F. Andreu, V. Caselles, J.M. Mazón, and S. Moll, “Finite Propagation Speed for Limited Flux Diffusion Equations”. *Archive for Rational Mathematics and Mechanics* 182 (2), pp. 269-297, October 2006.
80. A. Almansa, V. Caselles, G. Haro, and B. Rougé “Restoration and zoom of irregularly sampled, blurred, and noisy images by accurate total variation minimization with local constraints”. *Multiscale Modeling and Simulation*, 5(1), 235 - 272, 2006.
81. V. Caselles, “Total variation based image denoising and restoration”. *International Congress of Mathematicians. Vol. III*, 1453–1472, Eur. Math. Soc., Zürich, 2006.
82. C. Ballester, V. Caselles, L. Igual, and L. Garrido ‘Level Lines Selection with Variational Models for Segmentation and Encoding’. *Journal Mathematical Imaging and Vision*. 27 (2007), no. 1, 5–27.
83. F. Andreu, V. Caselles, J.M. Mazón, and S. Moll, “A Diffusion Equation in Transparent Media”. *Journal of Evolution Equations* 7 (2007), no. 1, 113–143.
84. V. Caselles. “Convergence of the ‘relativistic’ heat equation to the heat equation as $c \rightarrow \infty$ ”. *Publicacions Matemàtiques* 51 (2007), no. 1, 121–142.

85. V. Caselles, A. Chambolle and M. Novaga. “Uniqueness of the Cheeger set of a convex body”. *Pacific Journal of Mathematics* 232(1), 77–90, 2007.
86. M. Bertalmío, V. Caselles, E. Provenzi and A. Rizzi. “Perceptual Color Correction Through Variational Techniques”. *IEEE Transactions on Image Processing* 16, no. 4, 1058-1072, 2007.
87. L. Igual, J. Preciozzi, L. Garrido, A. Almansa, V. Caselles, B. Rougé. “Automatic low baseline stereo in urban areas”. *Inverse Problems and Imaging (IPI)* 1 (2007), no. 2, 319–348.
88. F. Andreu, V. Caselles, J.M. Mazón. “Limited flux diffusion equations”. *Bol. Soc. Esp. Mat. Apl. SEMA No. 35* (2006), 113–136.
89. M. Alemán, L. Álvarez and V. Caselles. “Texture-Oriented Anisotropic Filtering and Geodesic Active Contours in Breast Tumor Ultrasound Segmentation”. *Journal of Mathematical Imaging and Vision* 28(1), 81-97, 2007.
90. C. Ballester, M. Bertalmío, V. Caselles, L. Garrido, A. Marqués, F. Ranchin. “An Inpainting-based deinterlacing method”. *IEEE Transactions on Image Processing*, Vol. 16 (10), pp. 2476 - 2491, 2007.
91. M. Bertalmío, V. Caselles, A. Pardo, “Movie Denoising by Average of Warped Regions”. *IEEE Transactions on Image Processing* 16 (9), pp. 2333-2347, 2007.
92. V. Caselles, A. Chambolle, M. Novaga, “The discontinuity set of solutions of the TV denoising problem and some extensions”. *Multiscale Modeling and Simulation* 6(3), 879-894, 2007. **One of the three SIAM Outstanding Paper Prizes 2008.**
93. V. Caselles, E. Meinhardt, P. Monasse, “Constructing the tree of shapes of an image by fusion of the trees of connected components of upper and lower level sets”. *Positivity* 12(1), 55-73, 2007.
94. M. Bernot, V. Caselles, J.M. Morel. “The structure of branched transportation networks”. *Calc. Var. Partial Differential Equations* 32(3), 279–317, 2008.

95. A. Almansa, C. Ballester, V. Caselles, G. Haro. “A TV based restoration model with local constraints”. *Journal Scientific Computing* 34(3), 209–236, 2008.
96. F. Andreu, V. Caselles, and J.M. Mazón, “Some regularity results on the ‘relativistic’ heat equation”. *Journal of Differential Equations* 245, 3639-3663, 2008.
97. F. Andreu, V. Caselles, and J.M. Mazón, “Diffusion equations with finite speed of propagation”. *Functional analysis and evolution equations*, 17–34, Birkhäuser, Basel, 2008.
98. V. Caselles, G. Haro, G. Sapiro and J. Verdera, “Variational Models for Inpainting Surface Holes”. *Computer Vision and Image Understanding* 111, 351-373, 2008.
99. V. Caselles, A. Chambolle, M. Novaga and S. Moll. “A characterization of convex calibrable sets in \mathbb{R}^N with respect to anisotropic norms”. *Annales de l’Institut Henri Poincaré/Analyse non lineaire* 25(4), 803-832, 2008.
100. V. Caselles, R. Donat, G. Haro, “Flux-gradient and source term balancing for certain high resolution shock-capturing schemes”. *Computers and Fluids* 38, 16-36, 2009 (in press).
101. F. Alter, V. Caselles, “Uniqueness of the Cheeger set of a convex body”. *Non-linear Analysis, TMA*, Vol. 70, Issue 1, pp. 32-44, 2009.
102. R. Palma, E. Provenzi, M. Bertalmío and V. Caselles, “A Perceptually Inspired Variational Framework for Color Enhancement”. *IEEE transactions on Pattern Analysis and Machine Intelligence*, 31(1), pp. 458-474, March 2009. **Awarded with SIAG/IS prize 2012 from SIAM Activity Group on Imaging Science.**
103. E. Meinhardt, E. Zacur, A. Frangi, and V. Caselles “3D Edge Detection by Selection of Level Surface Patches”. *Journal Mathematical Imaging and Vision* 34(1), pp. 1-16, 2009.
104. S. Ferradans, M. Bertalmío and V. Caselles, “Geometry Based Demosaicking”. *IEEE Transactions in Image Processing* 18(3), pp. 665-670, March 2009.

105. G. Bellettini, V. Caselles, A. Chambolle, M. Novaga, “The volume preserving crystalline mean curvature flow”. *Journal de Mathématiques Pures et Appliquées* 92(5), pp. 499-527, 2009.
106. M. Bertalmío, V. Caselles, and E. Provenzi, “Issues about Retinex and Contrast Enhancement”. *International Journal of Computer Vision* 83(1), pp. 101–119, 2009.
107. A. Almansa, J.F. Aujol, V. Caselles, and G. Facciolo, “Irregular to regular sampling, denoising and deconvolution”. *SIAM J. Multiscale Modeling and Simulation*, vol. 7(4), pp. 1574-1608, 2009.
108. V. Caselles, G. Facciolo, and E. Meinhardt. “Anisotropic Cheeger Sets and Applications”, *SIAM Journal on Imaging Sciences*, Vol.2, No. 4, 1211-1254,2009.
109. F. Andreu, V. Caselles, J.M. Mazón, and S. Moll, “The Dirichlet problem associated to the relativistic heat equation”. *Mathematisches Annalen* 347(1), pp. 135–199, 2010.
110. V. Caselles, A. Chambolle, M. Novaga, “Some remarks on the uniqueness and regularity of Cheeger sets”. *Rendiconti del Seminario Matematico di Padova*, vol. 123, pp. 191-202, 2010.
111. V. Caselles, A. Chambolle, M. Novaga, “Regularity for solutions of the total variation denoising problem”. *Revista Matemática Iberoamericana* 27(1), pp. 233–252, 2010.
112. V. Caselles, A. Chambolle, D. Cremers, M. Novaga, Th. Pock, “An Introduction to Total Variation in image analysis”. Chapter in the book “Theoretical Foundations and Numerical Methods for Sparse Recovery”, edited by Massimo Fornasier. *Radon Series on Computational and Applied Mathematics*, De Gruyter 2010.
113. A. Bugeau, M. Bertalmío, V. Caselles and G. Sapiro. A Comprehensive Framework for Image Inpainting. *IEEE Transactions on Image Processing* 19(10), pp. 2634–2645, 2010.

114. V. Caselles, A. Chambolle, M. Novaga, “Total Variation in Imaging”. To appear in Handbook of Mathematical Methods in Imaging. Springer Verlag, 2010.
115. F. Andreu, V. Caselles, and J.M. Mazón, “A Fisher-Kolmogorov equation with finite speed of propagation”. Journal of Differential Equations, 248(10), pp. 2528–2561, 2010.
116. V. Caselles, M. Miranda, M. Novaga. Total variation, calibrability, and Cheeger sets in Gauss space. Journal Functional Analysis 259(6), pp. 1491–1516, 2010.
117. N. Papadakis, and V. Caselles, “Multilabel depth estimation for graph cuts stereo problems”. Journal Mathematical Imaging and Vision vol. 38, no. 1, pp. 70-82, 2010.
118. V. Caselles, “An existence and uniqueness result for flux limited diffusion equations”. Discrete and Continuous Dynamical Systems (special volume in honor to Ennio de Giorgi and Guido Stampacchia) 31(4), 1151-1195, 2011.
119. N. Papadakis, E. Provenzi, and V. Caselles, A variational model for histogram transfer of color images. IEEE Transactions on Image Processing 20(6), pp. 1682–1695, 2011.
120. M. Bertalmío, V. Caselles, G. Sapiro, and S. Masnou, Inpainting. To appear at Encyclopedia of Computer Vision.
121. T. Baeza, V. Caselles, P. Gargallo, and N. Papadakis, A narrow band method for the convex formulation of discrete multi-label problems. SIAM J. Multiscale Modeling and Simulation 8(5), pp. 2048-2078, 2010.
122. S. Ferradans, E Provenzi, M. Bertalmío and V. Caselles, An analysis of visual adaptation and contrast perception for a fast tone mapping operator. IEEE transactions on Pattern Analysis and Machine Intelligence, vol. 33(10), pp. 2002 - 2012, 2011.
123. M. El Kalmoun, L. Garrido, and V. Caselles. Line Search Multilevel Optimization as Computational Methods for Dense Optical Flow. SIAM Journal on Imaging Sciences (SIIMS) 4(2), 695-722, 2011.

124. P. Arias, G. Facciolo, V. Caselles, G. Sapiro. A Variational Framework for Exemplar-Based Image Inpainting. *International Journal of Computer Vision*, 93(3), pp. 319–347, 2011.
125. V. Caselles, On the entropy conditions for some flux limited diffusion equations. *Journal Differential Equations* 250 (8), pp. 3311-3348, 2011.
126. V. Caselles, A. Lunardi, M. Miranda, M. Novaga. Perimeter of sublevel sets in infinite dimensional spaces. *Advances in Calculus of Variations* 5(1), 59–76, 2012.
127. N. Papadakis, A. Bugeau, and V. Caselles. Image editing with spatiograms transfer. *IEEE Transactions on Image Processing* vol. 21(5), pp. 2513 – 2522, 2012.
128. F. Andreu, V. Caselles, J.M. Mazón, J. Soler, and M. Verbeni. Radially Symmetric Solutions of a Tempered Diffusion Equation. A porous media flux limited case. *SIAM J. Mathematical Analysis*, 44(2), 1019–1049, 2012.
129. P. Arias, V. Caselles, and G. Facciolo. Analysis of a Variational Framework for Exemplar-Based Image Inpainting. *Multiscale Model. Simul.*, 10(2), 473–514, 2012.
130. R. Sadek, C. Constantinopoulos, E. Meinhardt, C. Ballester, and V. Caselles, On Affine invariant descriptors related to SIFT. *SIAM J. Imaging Sci.*, 5(2), 652–687, 2012.
131. P. Arias, V. Caselles, G. Facciolo, V. Lazcano, and R. Sadek. Nonlocal Variational Models for Inpainting and Interpolation. To appear at *Mathematical Models in the Applied Sciences*, November 2012.
132. Y. Liu, and V. Caselles. Exemplar-based Image Inpainting using Multiscale Graph Cuts. To appear at *IEEE Transactions on Image Processing* 2012.
133. V. Caselles, K. Jalalzai, M. Novaga, “On the jump set of solutions of the Total Variation flow”. To appear *Rendiconti Sem. Matematico della Università di Padova* 2012.

134. N. Papadakis, A. Baeza, I. Rius, X. Armangué, A. Bugeau, O. D'Hondt, P. Gargallo, V. Caselles and S. Sagás. Virtual camera synthesis for soccer game replays. To appear at Journal Virtual Reality and Broadcasting (JVRB).
135. R. Sadek, G. Facciolo, P. Arias, and V. Caselles. A variational model for gradient-based video editing. To appear at International Journal of Computer Vision.
136. V. Caselles. Flux limited generalized porous media diffusion equations. To appear a Publicacions Matemàtiques.
137. F. Calderero, and V. Caselles. Recovering relative depth from low-level features without explicit T-junction detection and interpretation. To appear at International Journal of Computer Vision.
138. V. Caselles. Variational models for image inpainting. Proceedings of the European Congress of Mathematics, Krakow, 2012.
139. J.A. Carrillo, V. Caselles, and S. Moll. On the relativistic heat equation in one space dimension. To appear at the Proceedings of the London Mathematical Society.
140. V. Caselles. Convergence of flux limited porous media diffusion equations to its classical counterpart. To appear at the Annali della Scuola Normale Superiore di Pisa.
141. J. Cardelino, V. Caselles, M. Bertalmío, and G. Randall. A Contrario selection of optimal partitions for image segmentation. To appear at SIAM J. Imaging Sciences (SIIMS).
142. E. Provenzi and V. Caselles. A Wavelet Perspective on Variational Perceptually-Inspired Color Correction. To appear at International Journal of Computer Vision.

Submitted patents

1. L. Álvarez, and V. Caselles. Calibration method for a TV and video camera, year European Patent Application EP2287806, February, 2011.
2. F. Calderero, and V. Caselles. Relative Depth Estimation and Occlusion Detection from a Single Camera. Submitted European Patent, 2012.

Publications in Conferences

1. V. Caselles and C. Sbert, “What is the best causal scale space for 3D images?”, *Eighth Workshop on Image and Multidimensional Signal Processing. IEEE Signal Processing Soc.* Cannes September 8-10,1993.
2. C. Ballester, V. Caselles and M. González, “Affine invariant segmentation by variational methods”, *RFIA '94. Neuvième Congrès Reconnaissance des Formes et Intelligence Artificielle*, Paris 11-14 Janvier 1994 (AFCET). **SPECIAL MENTION.**
3. V. Caselles and G. Sapiro, “Histogram modification via partial differential equations,” *Proc. Second IEEE-International Conference on Image Processing*, Washington DC, October 1995.
4. V. Caselles and G. Sapiro, “Simultaneous contrast improvement and denoising via diffusion related equations,” *Proc. SPIE Vision Geometry*, San Diego, July 1995.
5. G. Sapiro, R. Kimmel, and V. Caselles, “Object detection and measurements in medical images via geodesic deformable contours,” *Proc. SPIE Vision Geometry*, San Diego, July 1995.
6. V. Caselles and G. Sapiro, “An image evolution approach for contrast enhancement in law enforcement data,” *Proc. SPIE-Investigative and Trial Image Processing*, San Diego, July 1995.
7. V. Caselles, R. Kimmel, and G. Sapiro, “Geodesic active contours,” *Proc. Int. Conf. Computer Vision*, Boston, June 1995. **“Test of Time” award in ICCV 2011.**

8. V. Caselles, "Geometric Models for Active Contours", *Proc. Int. Conf. on Image Processing*, Washington, October, 1995.
9. V. Caselles and L. Rudin, "Multiscale Total Variation", *Second European Conference on Image Processing*, Palma, Spain, September 1995.
10. R. Malladi, R. Kimmel, D. Adalsteinsson, G. Sapiro, V. Caselles, and J. A. Sethian, "A geometric approach to segmentation and analysis of 3D medical images," *Proc. Mathematical Methods in Biomedical Image Analysis Workshop*, San Francisco, June 21-22, 1996.
11. V. Caselles, R. Kimmel, G. Sapiro, and C. Sbert, "Three-dimensional object modeling via minimal surfaces." *Proc. European Conference on Computer Vision*, Cambridge-UK, April 1996.
12. Caselles, R. Kimmel, G. Sapiro, and C. Sbert, "3D Active Contours." *12th International Conference on Analysis and Optimization of Suystems Images, Wavelets and PDE's, ICAOS'96*, Paris, June 26-28, 1996.
13. V. Caselles, B. Coll et J. M. Morel, "Junction Detection and Filtering : A morphological Approach", *Proc. Int. Conf. on Image Processing* pp. 493-496, Lausanne, 16-19 Septembre 1996.
14. V. Caselles, B. Coll and J. M. Morel, "Scale space versus Topographic Map for Natural Images", *Scale-space 97*, Utrecht, July 1997, Springer Verlag, 1997.
15. V. Caselles, J.M. Morel and C. Sbert, "Axiomatic Approach to Image Interpolation", *Proc. 3rd Catalan Days on Applied mathematics*, J. Chavarriga and J. Giné eds., pp. 27-37, November 27-29, Lleida, Spain, 1996.
16. V. Caselles, J-L. Lisani, J-M. Morel, and G. Sapiro, "Shape preserving local contrast enhancement," *Proc. IEEE-International Conference on Image Processing*, Santa Barbara, California, October 1997.
17. V. Caselles, J.M. Morel and C. Sbert, "An Axiomatic Approach to Image Interpolation", *Proc. IEEE-International Conference on Image Processing*, Santa Barbara, California, October 1997.

18. F. Cao, V. Caselles, J.M. Morel and C. Sbert, "An axiomatic Approach to Image Interpolation", *Proceedings of the Conference Partial Differential Equations, Theory and Numerical Solutions*, Prague, August 10-15, 1998.
19. V. Caselles, G. Sapiro and B. Tang, "Direction Diffusion," *Proceedings of the International Conference on Computer Vision, ICCV 99*, Greece, September 1999.
20. V. Caselles, G. Sapiro and D.H. Chung, "Vector Median Filters, Vector Morphology, and Coupled PDE's: Theoretical Connections," *Proceedings of the ICIP 99*, Japan, October 1999.
21. V. Caselles, G. Sapiro and B. Tang, "Color Image Enhancement via Chromaticity Diffusion," *Proceedings of the ICIP 2000*.
22. C. Ballester, M. Bertalmio, V. Caselles, G. Sapiro, "Image Inpainting," *Computer Graphics (Siggraph) 2000*.
23. C. Ballester, M. Bertalmio, V. Caselles, G. Sapiro and J. Verdera, "Filling-In Interpolation by Variational Method," *ICCV*, 2001.
24. M. Bertalmio, V. Caselles, B. Rougé and A. Solé, "Total Variation Image Restoration with Local Constraints". *EUSIPCO*, 2002.
25. O. Sander, V. Caselles, and M. Bertalmío, "Axiomatic Scalar Data Interpolation on Manifolds". *ICIP 2003*, Barcelona.
26. C. Ballester, V. Caselles and J. Verdera, "A Variational Model for Disocclusion". *ICIP 2003*, Barcelona.
27. J. Verdera, V. Caselles, M. Bertalmío and G. Sapiro, "Inpainting Surface Holes". *ICIP 2003*, Barcelona.
28. A. Solé, V. Caselles, G. Sapiro and F. Aràndiga, "Morse Description and Geometric Encoding of DEM data". *ICIP 2003*, Barcelona.
29. M. Bertalmío, G. Haro, and V. Caselles, "Visual Acuity in Day for night". *2nd IEEE Workshop on Variational, Geometric and Level Set Methods in Computer Vision*, October 12, 2003, Nice, France.

30. C. Ballester, V. Caselles, J. Verdera, and B. Rougé, “A Variational Model for P+XS Image Fusion ”. 2nd IEEE Workshop on Variational, Geometric and Level Set Methods in Computer Vision, October 12, 2003, Nice, France.
31. V. Caselles, L. Igual, and L. Garrido, “A Contrast Invariant Approach to Motion Estimation”. Scale Space 2005. Hofgeismar, Germany, April 2005. Lecture Notes in Computer Science 3459, pp. 242-253 2005
32. J. Cardelino, G. Randall, M. Bertalmío and V. Caselles. “Region Based Segmentation Using the Tree of Shapes”. ICIP 2006.
33. G. Facciolo, F. Lecumberry, A. Almansa, A. Pardo, V. Caselles, “Constrained Anisotropic Diffusion and some Applications”. British Machine Vision Conference 2006 Edinburg, UK, 2006.
34. V. Caselles, “Total Variation based image denoising and restoration”. International Congress of Mathematicians, August 2006. Madrid.
35. J. Cardelino, G. Randall, M. Bertalmío, and V. Caselles, “Region Based Segmentation Using the Tree of Shapes”. International Conference on Image Processing, Atlanta, USA, September 2006.
36. J. Cardelino, V. Caselles, M. Bertalmío, G. Randall. A contrario hierarchical image segmentation. International Conference on Image Processing ICIP 2009, El Cairo, Egipto, Noviembre 2009.
37. G. Facciolo, and V. Caselles. Geodesic neighborhoods for piecewise affine interpolation of sparse data. International Conference on Image Processing ICIP 2009, El Cairo, Egipto, Noviembre 2009.
38. P. Arias, V. Caselles, and G. Sapiro. A variational framework for non-local image inpainting, Proceedings of the 7th International Conference on Energy Minimization Methods in Computer Vision and Pattern Recognition EMMCVPR, Springer Lecture Notes in Computer Science, Bonn, August 2009.
39. G. Facciolo, P. Arias, V. Caselles, and G. Sapiro. Exemplar-Based Interpolation of Sparsely Sampled Images, Proceedings of the 7th International Conference

- on Energy Minimization Methods in Computer Vision and Pattern Recognition, EMMCVPR, Springer Lecture Notes in Computer Science, Bonn, August 2009.
40. S. Ferradans, M. Bertalmío, E Provenzi, and V. Caselles, A multimodal approach to perceptual tone mapping. Proceedings of the 6th European Conference on Visual Media Production (CVMP), London (UK), November 12th-13th 2009.
 41. Y. Liu and V. Caselles, Spatial string matching for image classification. Proceedings of International Conference on Pattern Recognition (ICPR 2010), August 23-26, 2010.
 42. A. Hervieu, N. Papadakis, A. Bugeau, P. Gargallo, V. Caselles, Stereoscopic image inpainting: distinct depth maps and images inpainting. Proceedings of International Conference on Pattern Recognition (ICPR 2010), August 23-26, 2010.
 43. N. Papadakis, A. Baeza, P. Gargallo, and V. Caselles. Polyconvexification of the multi-label optical flow problem. ICIP 2010, September, pp. 765–768.
 44. N. Papadakis, A. Baeza, I. Rius, X. Armangué, A. Bugeau, O. DHondt, P. Gargallo, V. Caselles and S. Sagás. Virtual camera synthesis for soccer game replays, 2010 Conference on Visual Media Production (CVMP 2010), November, pp. 97–106.
 45. O. DHondt, and V. Caselles. Unsupervised Motion Layer Segmentation by Random Sampling and Energy Minimization. CVMP 2010.
 46. A. Bugeau, P. Gargallo, O. DHondt, A. Hervieu, N. Papadakis and V. Caselles. Coherent Background Video Inpainting through Kalman Smoothing along Trajectories. Vision, Modeling, and Visualization 2010, pp. 123–130.
 47. A. Hervieu, N. Papadakis, A. Bugeau, P. Gargallo, V. Caselles. Stereoscopic Image Inpainting Using Scene Geometry. IEEE International Conference on Multimedia and EXPO (ICME), July 11-15, 2011, Barcelona.

48. E. Meinhardt, C. Constantinopoulos, Y. Liu, and V. Caselles. A robust pipeline for logo detection. IEEE International Conference on Multimedia and EXPO (ICME), July 11-15, 2011, Barcelona.
49. E. Meinhardt, O. D'Hondt, G. Facciolo, and V. Caselles. Relative Depth from Monocular Optical Flow. International Conference on Image Processing, September 11-14, Brussels, Belgium 2011.
50. Y. Liu, and V. Caselles. Improved support vector machines with distance metric learning. Proceedings of Advanced Concepts for Intelligent Vision Systems (ACIVS), Het Pand, Ghent, Belgium, August 22-25, 2011.
51. Y. Liu, and V. Caselles. Supervised visual vocabulary with category information. Proceedings of Advanced Concepts for Intelligent Vision Systems (ACIVS), Het Pand, Ghent, Belgium, August 22-25, 2011.
52. G. Facciolo, R. Sadek, A. Bugeau, and V. Caselles. Temporally consistent gradient domain video editing. Proceedings of the 8th International Conference on Energy Minimization Methods in Computer Vision and Pattern Recognition (EMMCVPR) 2011, Saint-Petersburg, July 25-27, 2011.
53. E. Provenzi and V. Caselles. An artifact-free wavelet model for perceptual contrast enhancement of color images. Int. Conference on Computer Vision Theory and Applications (VISAPP 2012) Rome, Italy, 24-26 February, 2012.
54. R. Sadek, C. Ballester, L. Garrido, E. Meinhardt, and V. Caselles. Frame interpolation with occlusion detection using a time coherent segmentation. Int. Conference on Computer Vision Theory and Applications (VISAPP 2012) Rome, Italy, 24-26 February, 2012.
55. S. Ferradans, E. Provenzi, M. Bertalmío and V. Caselles. Generation of HDR Images in Non-Static Conditions Based On Gradient Fusion. Int. Conference on Computer Vision Theory and Applications (VISAPP 2012) Rome, Italy, 24-26 February, 2012.

56. E. Provenzi, V. Caselles: ‘Variational Principles and Perceptual Color Correction of Digital Images’, Third International Conference on Appearance Predicting Perception, paper 7, April 17-19, Edinburgh, UK.
57. C. Ballester, L. Garrido, V. Lazcano, V. Caselles, A TV-L1 Optical Flow Method with Occlusion Detection. To appear in Volume 7476 of the Lecture Notes in Computer Science series. DAGM-OAGM, Graz, Austria, August 2012.
58. Nicolas Duchateau, Mathieu De Craene, Marta Sitges, and Vicent Caselles. Adaptation of multiscale function extension to inexact matching. Application to the mapping of individuals to a learnt manifold. GSI2013 - Geometric Science of Information, August 2013.

Other publications

1. V. Caselles, “On the Radon-Nikodym property in Banach lattices”, *Semesterbericht Funktionalanalysis*, Band 10. Sommersemester 1986. Univ. Tuebingen
2. V. Caselles, “Harris operators and the order spectrum”, *Semesterbericht Funktionalanalysis*, Band 9. Wintersemester 1985/86. Univ. Tuebingen
3. V. Caselles and M. González, “Compactness properties of strictly singular operators in Banach lattices”, *Semesterbericht Funktionalanalysis*, Band 12. Sommersemester 1987. Univ. Tuebingen.
4. V. Caselles “The Perron-Frobenius theorem for positive operators in Banach lattices”, *Publications Mathematiques de Besançon*, 1987.
5. V. Caselles “Duality and Nonlinear Equations governed by Accretive OPERators II”, *Publications Mathematiques de Besançon*, 1989.
6. V. Caselles, B. Coll et J. M. Morel, “PDE,s in Image Smoothing”, *Seminaire de l’École Polytechnique*, Palaiseau, Paris, 1996.
7. V. Caselles, S. Masnou, J.M. Morel and C. Sbert, “Image Interpolation”, *Seminaire de l’École Polytechnique*, Palaiseau, Paris, 1998.

8. V. Caselles, S. Masnou and J.M. Morel, La vision, est-elle une machine géométrique ? *La Recherche*, no. 346, October 2001, pp. 78-82. Also published in *Mundo Científico*, no. 230, January 2002, pp. 62-67.

Technical Reports

1. V. Caselles, B. Coll and J.M. Morel, “ A Kanizsa Programme”, *Preprint Ceremade* 1996. **One of the three annual selected articles by the SPM Department of the Centre National pour la Recherche Scientifique (CNRS, France) in 1996. Object of articles in “Le Courier du CNRS”, “Science et Vie” and “Le Nouvel Observateur”.**
2. O. D’Hondt, G. Facciolo, E. Meinhardt, V. Caselles. Efficient Multi-label Video Segmentation Based on Geodesic Distance. Preprint, 2010.
3. O. D’Hondt, V. Caselles. Unsupervised Motion Layer Segmentation by Random Sampling and Energy Minimization. Preprint 2011.
4. J. Calvo, J. Campos, V. Caselles, O. Sánchez, and J. Soler. Pattern formation in a flux limited reaction-diffusion equation of porous media type. Preprint.
5. N. Papadakis, J.F. Aujol, V. Caselles, and R. Yildizoglu. Convexification of high-dimensional multilabel problems. Preprint.
6. J. Calvo, and V. Caselles. Some regularity results for flux limited porous media diffusion equations. Preprint.
7. J. Calvo, and V. Caselles. Regularity results for the one-dimensional relativistic heat equation. In preparation.
8. F. Calderero, and V. Caselles. Multiscale Analysis for Images on Riemannian Manifolds. Part I. Preprint 2013.
9. F. Calderero, and V. Caselles. Multiscale Analysis for Images on Riemannian Manifolds. Part II. Preprint 2013.
10. C. Ballester, F. Calderero, V. Caselles, and G. Facciolo. Multiscale analysis of similarities between images on Riemannian manifolds. Preprint 2013.

INVITED CONFERENCES

1. Functional Analysis Conference, Oberwolfach, Germany, 1987.
2. Riesz Spaces and Positive Operators, Oberwolfach, Germany, 1989.
3. Convex Analysis, Oberwolfach, Germany, 1990.
4. Modélisation Mathématique pour le traitement d'images, INRIA, Rocquencourt, France, 1992.
5. *First European Conference on Mathematical Image Modeling*, Las Palmas, Spain, March 1994.
6. Second Italy-Spain Meeting on Nonlinear Analysis and PDE's, L'Aquila, Italy, 1994.
7. International Conference on Applied Mathematics, Hamburg, 1995.
8. *IEEE International Conference on Image Proc.*, Special Session: PDE's in Image Processing, Washington DC, October, 1995.
9. Catalan Days on Applied Mathematics, Lleida, Spain, 1996.
10. *IEEE International Conference on Image Proc.*, Special Session: PDE's in Image Processing, Lausanne, September 16-19, 1996.
11. *IEEE International Conference on Image Proc.*, Special Session: PDE's in Image Processing, Santa Barbara, October, 1997.
12. *Foundations of Computational Mathematics*, IMPA, Rio de Janeiro, January 1997.
13. XV CEDYA- V CMA, Vigo, Spain, September 1997.
14. "Partial Differential Equations, Theory and Numerical Solutions," Prague, August 10-15, 1998.

15. "Mathematical Questions in Signal and Image Processing," Centre International de Recherche Emile Borel, Institut Henri Poincaré, Paris, September 14th-December 18th, 1998.
16. "Mathematical Models in Image Processing," UAB, Barcelona, July, 1999.
17. "Mathematical Models in Image Processing," DMV Seminar, Oberwolfach, to be held in November 1999.
18. "Tercera Trobada de la Societat Catalana de Matemàtiques," 1499-1999, Cinc Segles de la Universitat de Valencia, Universitat de Valencia, 24 de Marzo de 2000.
19. "Multimedia year at the IMA", University of Minnesota, O30-November 20, 2000.
20. "Instructional Conference on Nonlinear Partial Differential Equations", Edinburgh, 8-18, January 2001.
21. Cursos de la U.C., XVII Curso de Laredo, "Escuela Prospectiva de Matemática Aplicada", 3-7 Septiembre, 2001.
22. Seminar of the UC Madrid, February 27, 2001.
23. Conference in the seminar "Restauration des images de tldtection", CNES Toulouse, April 26, 2001.
24. Seminar of the ENS Cachan, May 3, 2001.
25. Conference: La geometria de les imatges, Facultad de Bellas Artes, Universidad Politécnica de Valencia, February 2001.
26. "The Mathematical, Computational and Biological Study of Vision", DMV Seminar, Oberwolfach, November 4-10, 2001.
27. Conference in the seminar: La Matemática y sus Aplicaciones: Un Reto en la Enseñanza Actual, January 26, 2002, Universidad Politécnica de Valencia.

28. Lectures on Image Processing, January 18, 2002, Departamento de Teoría del Señal y Comunicaciones, Universidad Politécnica de Catalunya.
29. Lectures on Image Processing, Universidad Autónoma de Madrid, 4-10 March 2003.
30. Ferran Sunyer i Balaguer Prize Conference at the IEC, April 24, 2003.
31. Conference at the Laboratoire d'Analyse Numerique, Paris VI, March 25 2003.
32. Conference at the Special Session "PDE Methods in Continuum Mechanics" of the First Joint International Meeting between the American Mathematical Society and the Real Sociedad Matemática Española. June 18-21, Sevilla, 2003.
33. Conference in "New Challenges in Applied Mathematics", Castro Urdiales, September 1-5, 2003.
34. Conference "Optimal Transport Theory and Applications", Scuola Normale Superiore di Pisa, October 9-12, 2003.
35. Plenary speaker in "Primer Congreso Conjunto de Matemáticas RSME-SCM-SEIO-SEMA, MAT.ES 2005", January 31-February 4, 2004, Valencia (Spain).
36. Lectures (10h) in the Ph.D. program of the University of Granada, April 2004.
37. Invited talk at Visualization Colloquium, ZIB, Berlin, November 8, 2004.
38. Conference in Escuela Superior de Ingenieros, Matematica Aplicada II, University of Sevilla, November 17, 2004.
39. Plenary conference at the Joint Meeting of the RSME, SEMA, SCM, SEIO. University of Valencia, January 31-February 4, 2005.
40. Invited conference at the International Conference Free Boundary Problems: Theory And Applications, 7-12 June 2005, University of Coimbra, Portugal.
41. Invited Conference at the Workshop Segones jornades de PDEs a Barcelona, Barcelona, September 2005.

42. Invited Conference at the Workshop on PDE's, Optimal Design and Numerics, Benasque (Spain), August 29 to September 9, 2005.
43. Invited Conference at the "Journées Mathématiques de l'Image, Université de Nice-Sophia Antipolis (France), January 12-13, 2006.
44. Lectures (10h) in the Ph.D. program of the University of Granada, March 2006.
45. Invited Conference at the International Congress of Mathematicians, Madrid, August 2006.
46. Invited Conference in PDEs Approaches to Image Processing (Title: Mathematical aspects of image restoration). University of Koeln, October 2006.
47. Invited Conference in Jornada de Ecuaciones en derivadas parciales (title: Detección de contornos y conjuntos de nivel de una imagen). Universidad de Valencia, 21 de Noviembre de 2006.
48. Organizer (jointly with M. Rumpf, G. Dziuk and P. Schroeder) of the Workshop "Trends in Mathematical Imaging and Surface Processing" held in Mathematisches Forschungsinstitut Oberwolfach, January 21 to January 27, 2007. Oberwolfach, Germany.
49. Invited Conference in 1st Prisma Thematic Network Meeting, held in Toledo (Spain), February 8-9, 2007.
50. Invited Conference in TULKA (Tuebingen, Ulm, Karlsruhe) Meeting in the University of Tuebingen (500 years of Mathematics in Tuebingen), Germany, February 15, 2007.
51. Invited conference in "Moving boundaries and Applications", Roscoff (France), May 9 to 11th, 2007.
52. Course in Variational and PDE Techniques in Image Processing, Simumat Summer course, Castro Urdiales (santander, Spain), July 2007.
53. Invited conference in "Partial Differential Equations, Optimal Design and Numerics", Benasque, September 2007.

54. Course in the "Spanish-French School Jacques-Louis Lions on Numerical Simulation in Physics and Engineering", Valladolid (Spain), September 15-19, 2008.
55. Invited speaker at the "6th Euro-Maghreb Workshop on Semigroups, Evolution Equations and Applications", to be held at CIRM, Luminy France, November 10-14, 2008.
56. Invited speaker at "Jornadas de EDPs y aplicaciones. Granada 18 y 19 de diciembre de 2008."
57. Seminar at the Scuola Normale Superiore di Pisa, April 8, 2009.
58. Invited speaker at "Variational Analysis and Applications". International School Guido Stampacchia at International Center for Scientific Culture E. Majorana. Sicily May 9-17, 2009.
59. Invited speaker at the "Conference in memoriam of Fuensanta Andreu". Burjassot (València), Spain, May 28-30, 2009.
60. Invited speaker at the School and Workshop on "PDE's, Optimal Design and Numerics III". Benasque Center for Science, August 23 - September 4, 2009.
61. Course in the PhD program of the Politechnics University of Valencia, December 7-11, 2009.
62. Invited speaker at the Conference "Motions of Interfaces and Nonlinear PDEs", February 1-4, 2010, Tours, France.
63. Organizer of the Minisymposium "Mathematical models in image processing" in the Joint SIAM/RSME-SCM-SEMA Meeting "Emerging Topics in Dynamical Systems and Partial Differential Equations" DSPDEs'10 May 31st, June 4th, 2010. Barcelona, Spain
64. Invited speaker at the GNAMPA - ERC summer school organized by Nicola Fusco, 13th to 18th June 2010 in Ischia.
65. Invited speaker at the 1st Swedish-Catalan Conference in Mathematics, Partial Differential Equations session Organized by Neus Cónsul and Henrik Shahgholian, Barcelona, September 16-18, 2010.

66. Invited speaker at the International Conference on Evolution Equations. In Honor of the 60th birthday of Wolfgang Arendt, Jan Prüss and Lutz Weis. Schnitten, Germany, October 11-15, 2010.
67. Organizer (jointly with M. Rumpf, G. Sapiro and P. Schroeder) of the Workshop "Trends in Mathematical Imaging and Surface Processing" (ID:1105) held in Mathematisches Forschungsinstitut Oberwolfach, January 30th - February 5th, 2011. Oberwolfach, Germany.
68. Seminar at the Department of Applied Mathematics, Universidad Complutense de Madrid, May 6, 2011.
69. Invited plenary speaker at the 7th International Congress on Industrial and Applied Mathematics, July 18-22, 2011, Vancouver, Canada.
70. Invited speaker at the School and Workshop on "PDE's, Optimal Design and Numerics IV". Benasque Center for Science, August 28 - September 9, 2011.
71. Invited plenary speaker at the ÖMG-Tagung 2011 - CSASC 2011, Joint Mathematical Conference of the Austrian Mathematical Society at the Donau-Universität Krems, together with the Austrian, Catalan, Czech, Slovak and Slovenian Mathematical Societies, Donauuniversität Krems September 25 to September 28, 2011.
72. Organizer of the "Escuela de Matemáticas Lluís Santaló 2011 (RSME-UIMP): Matemáticas y visión por ordenador. From August 8 to August 12, 2011.
73. Invited plenary speaker at the XII CEDYA, Palma de Mallorca (Balears), Spain.
74. Co-organizer (with Michal Benes, Karol Mikula and Otmar Scherzer) of the minisymposium on "Nonlinear PDEs - modelling, computations, applications" at the congress of the Catalan, Czech, Slovak and Slovenian Mathematical Societies (CSASC 2011), Donauuniversität Krems September 25 to September 28, 2011.
75. Invited speaker at the Conference "Mathematics and Image Analysis 2012", Institut Henri Poincaré, January 16-18, 2012, Paris (France).

76. Invited lecture at the "6th European Congress of Mathematics", July 2-7, 2012, Krakow (Poland).
77. Invited speaker at the International School of Mathematics 'Guido Stampacchia': Variational Analysis and Applications May 14-22, 2012 (Sicily). Organizers: N. Fusco, A. Maugeri, B. S. Mordukhovich.
78. Invited speaker at the International Conference "Variational Problems with Multiple Scales", Otranto (Italy), June 6-8, 2012.
79. Euro-Maghreb Workshop on 'Evolution Equations' in Lecce (Italy), June 11-15, 2012.
80. Course on Image Processing at the University of Bilbao. January 2012.
81. 52nd ICREA Colloquium: What do heating your living room, financial investments, and image processing have in common? January 15, 2013. Institut ICREA, Barcelona.

RESEARCH GRANTS

1. *Análisis Numérico de la Ecuación del Transporte*, DGICYT (PS90-0271). From 02-08-91 to 01-08-93.
2. *Procesamiento de la información visual, segmentación, análisis de imágenes 3D y aplicaciones biomédicas*, DGICYT (PB94-1174). From 01-07-95 to 01-07-98.
3. *Acciones Integradas Hispano-Francesas, Picasso 1997*.
4. *Viscosity Solutions and Their Applications* European Project on Human Capital and Mobility, reference FMRX-CT98-0234, local coordinator.
5. *PICS Project*, CNRS, France.
6. *EDP's geométricas: análisis de imágenes y propiedades de simetría*. Reference: BFM2000-0962-C02-01.
7. Distinció de la Generalitat per a la recerca 2002-2006.

8. *Modelos matemáticos en procesamiento de imágenes*, Financed by MEC, Reference BFM2003-02125. From 2003 to 2006.
9. *Structure detection in three dimensional tissue data*, Financed by Ministerio de Asuntos Exteriores (PCI-Iberoamrica 2003). Participating: UPF and Universidad de La Republica (Uruguay) From 01-01-2004 to 31-12-2004.
10. *Modelos matemáticos en procesamiento de imágenes y vídeo*, Financed by MEC, reference MTM2006-14836. From 01-10-2006 to 30-09-2009.
11. *Modelos matemáticos en procesamiento de imágenes y aplicaciones a la síntesis de vistas* Financed by MICINN, reference MTM2009-08171 From 01-01-2009 to 31-12-1012.
12. B Grup de recerca consolidat 2009 SGR 773, Financed by the Generalitat de Catalunya
13. ERC Grant (Grant agreement No. 319899). Project: INPAINTING: Inpainting Tools for Video Post-production. Variational Theory and Fast Algorithms. Duration: 5 years.
14. *Modelos variacionales para inpainting: Aplicación a la post-producción de video* Financed by MICINN, reference MTM2012-30772 From: 2013 to 2015.

PARTICIPATION IN OTHER RESEARCH GRANTS

1. *Mathematical Modelling of Image Processing*, European Project on Human Capital and Mobility. From 01-10-93 to 31-12-95.
2. *Acciones Integradas Hispano-Francesas 1992*. From 01-01-92 to 31-12-92.
3. *Acciones Integradas Hispano-Francesas 1993*. From 01-01-93 to 31-12-93.
4. *Física Estadística, Fenómenos No Lineales y sus Aplicaciones*, DGICYT (PB94-1167 Modalidad C). From 1995 to 2000. Coordinator: M. San Miguel.
5. *EC Project PAVR*, reference ERB FMRX-CT96-0036.

6. *Satellite Image Restoration*, Financed by CNES (Centre National d'Études Spatiales), Toulouse, France. From February 2001 to September 2001.
7. *Speed FX: Very high resolution real-time graphic interaction for the media industries*, IST-2001-34337, European Commission, area of Multimedia Contents and Tools, Technologies (IST) programme. From 01-05-2002 to 30-04-2004.
8. *RACINE: Integrated Project- Research Area CINE*, Contract Number: IST-511316. Duration 42 months. From 01-10-04 to 31-03-2008..
9. *Restauration morphologique d'images satellitaires*, Financed by CNES (Centre National d'Études Spatiales), Toulouse, France. From September 2002 to September 2003.
10. *Integrated Project - 2020 3D Media: Spacial Sound and Vision*, Financed by EC, 7mo Programa Marco, ICT - call 1. From 01-03-2008 to 29-02-2012.
11. *i3media: Tecnologías para la creación y gestión automatizada de contenidos audiovisuales inteligentes* Financed by Programa CENIT del MCYT. Participating: Mediapro, Alcatel.Lucent, Havas Media, Telefonica I+D, Activa Multimedia, CCRTV-SSGG, TV3, Infospeech, Fonetics, STT, Brainstorm, Noufer. Coordinated by Mediapro. From January 2007 to December 2010.
12. Free-viewpoint Immersive Networked Experience (FINE), Financed by European Commission. Participating: Mediaproductin SL, Bitmanagement Software GMBH, Kungliga Tekniska Hogskolan, Universiteit Hasselt, Fundació Barcelona Media Universitat Pompeu Fabra, Retevisin I S.A., Tracab, EVS Broadcast Equipment. Responsible: Mediaproducción, S.L.. From 01/04/2010 to 01/04/2013.

CONFERENCE ORGANIZATIONS & JOURNAL ACTIVITIES

1. Co-Organizer and Co-Chairman of the special session on "Partial Differential Equations (PDE's) and Geometry-Driven Diffusion in Image Processing and Analysis," *Third IEEE-International Conference on Image Processing*, Lausanne, September 16-19, 1996.

2. Organizer of the *Second European Conference on Image Processing*, Palma de Mallorca, Spain, September 1995.
3. Member of the Program Committee, *ICAOS '96, 12th International Conference on Analysis and Optimization of Systems, Images, Wavelets and PDE's*, Paris, June 26-28, 1996.
4. Guest Co-Editor, *IEEE Transactions on Image Processing*, Special Issue on "Partial Differential Equations and Geometry Driven Diffusion," 1997.
5. Member of the Program Committee, *Scale-Space '97*, Utrecht, July 2-4, 1997.
6. Member of the Program Committee, *Scale-Space '99*, Crete, Grece, August 1999.
7. Reviewer for *ICIP '99*, October 25-28, 1999.
8. Member of the Program Committee, *VIII National Symposium on Pattern Recognition and Image Analysis*, Bilbao, 12-14 May, 1999.
9. Organizer of the Minisymposium on Image Processing and PDE's in Foundations of Computational Mathematics, Oxford, 1999.
10. Coorganizer of the Workshop of the TMR "Viscosity Solutions and their Applications", Palma de Mallorca, March 7-9, 2001.
11. Co-Organizer and Co-Chairman of the special session on "Partial Differential Equations and Differential Geometry in Image Processing," *IEEE-International Conference on Image Processing*, Barcelona, September 14-17, 2003.
12. Member of the editorial board of the Journal: *Journal of Mathematical Imaging and Vision*.
13. Member of the editorial board of the Journal: *Publicacions Matemàtiques*.
14. Member of the editorial board of the Journal: *IEEE Transactions on Image Processing*.

15. Member of the editorial board of the Journal: International Journal of Computer Vision.
16. Member of the editorial board of the Journal: Multiscale Modeling and Simulation (SIAM).
17. Member of the editorial board of the Journal: SIAM Journal on Imaging Sciences (SIIMS).
18. Member of the editorial board of M3AS: Mathematical Models and Methods in Applied Sciences (started January 2012).
19. Coorganizer (with G. Bellettini and M. Novaga) of the Workshop "Interface Evolutions and Applications", Centro de Giorgi, Pisa, September 27-29, 2004
20. Member (with G. Bellettini and M. Novaga) of the Research Group "Evolution of Interfaces", Centro de Giorgi, Pisa. Started at 2004.
21. Co-organizer (jointly with M. Rumpf, G. Dziuk and P. Schroeder) of the Workshop "Trends in Mathematical Imaging and Surface Processing" held in Mathematisches Forschungsinstitut Oberwolfach, January 21-27, 2007. Oberwolfach, Germany.
22. Organizer of the Minisymposium "Mathematical models in image processing", Joint SIAM/RSME-SCM-SEMA Meeting DSPDEs'10 May 31st, June 4th, 2010. Barcelona, Spain.
23. Co-organizer (jointly with M. Rumpf, G. Sapiro and P. Schroeder) of the Workshop "Trends in Mathematical Imaging and Surface Processing" (ID:1105) held in Mathematisches Forschungsinstitut Oberwolfach, January 30th - February 5th, 2011. Oberwolfach, Germany.
24. Co-organizer (with Michal Benes, Karol Mikula and Otmar Scherzer) of the minisymposium on "Nonlinear PDEs - modelling, computations, applications" at CSASC 2011, Krems Sept. 25-28, 2011.
25. Organizer of the "Escuela de Matemáticas Lluís Santaló 2011 (RSME-UIMP): Matemáticas y visión por ordenador". From August 8 to August 12, 2011.

26. Co-organizer (with Karol Mikula) of the Workshop 'PDEs and variational methods in image processing', in ALGORITMY 2012 (Slovakia).

SUPERVISED Ph. D's.

1. Francesc Aràndiga Llaudes, *Aproximación de operadores y continuidad del radio espectral*, University of València, 1992.
2. Coloma Ballester Nicolau, *Un model invariant afi en segmentació d'imatges: anàlisi matemàtica i aplicacions*, University of Illes Balears, 1995. Cosupervisor with J.M. Morel.
3. Catalina Sbert Juan, *Tractament d'imatges tridimensionals i aplicacions*, University of Illes Balears, 1995. Cosupervisor with J.M. Morel.
4. Manuel González Hidalgo, *Contribució a l'anàlisi matemàtica i segmentació d'imatges*, University of Illes Balears, 1995. Cosupervisor with J.M. Morel.
5. Andrés Solé Martínez, *Geometric Image Coding, Filtering and Restoration*, Universitat Pompeu Fabra, June 20th, 2002.
6. Joan Verdera Ribas, *Some interpolation problems in Image Processing*, Universitat Pompeu Fabra, February 10, 2004.
7. José Salvador Moll Cebolla, *Ecuaciones Parabólicas que minimizan funcionales con crecimiento lineal*, Universitat de València, February 3, 2005. Cosupervisor with F. Andreu and J.M. Mazón.
8. Gloria Haro Ortega, *Numerical simulation of shallow water equations and some physical models in image processing*, July 11, 2005. Cosupervisor with Rosa Donat.
9. Marc Bernot, *Optimal Transport and Irrigation*, October 28, ENS Cachan, 2005. Cosupervisor with J.M. Morel.
10. Laura Igual, *Image Segmentation and Compression using the tree of shapes of an image. Motion Estimation*, January 16, 2006. Cosupervised with Luis Garrido.

11. François Alter, *Total Variation, theory and applications*, January 14, ENS Cachan, 2008. Cosupervisor with J.M. Morel.
12. Gabriele Facciolo Furlan, *Irregularly sampled image restoration and interpolation*, Universitat Pompeu Fabra, March 3, 2010.
13. Enric Meinhardt Llòpis, *Morphological and Statistical Techniques for the Analysis of 3D Images*, Universitat Pompeu Fabra, March 3, 2010.
14. Sira Ferradans Ramonde, *Color image processing problems in digital photography*, Universitat Pompeu Fabra, 2011. Cosupervised with M. Bertalmío.
15. Rida Sadek. Some Problems On Temporally Consistent Video Editing And Object Recognition. Universitat Pompeu Fabra, December 7, 2012.