

Irene Maria Quintanilha Coelho da Fonseca

Mellon College of Science University Professor of Mathematics

Irene Fonseca's work combines teaching, research and training in nonlinear analysis.

Since 1998 Irene Fonseca is the Director of the Center for Nonlinear Analysis in the Department of Mathematical Sciences, which primary focus is research and training in applied mathematics at the broad interface between mathematics and the physical science and engineering. Fonseca's research program includes the mathematical study of shape memory alloys, ferroelectric, magnetic materials, composites, liquid crystals, thin structures, phase transitions, and mathematical analysis of image segmentation, denoising, detexturing and recolorization in computer vision.

## EDUCATION:

- 1985 Doctor of Philosophy, University of Minnesota, Minneapolis
- 1983 Master of Science, University of Minnesota, Minneapolis
- 1980 Licenciatura in Mathematics, University of Lisbon
- 1973 High school studies, Lisbon

## LANGUAGES SPOKEN FLUENTLY:

English, French, Portuguese.

## HONOURS AND AWARDS:

- 2016 2016 Aziz Lecturer, University of Maryland
- 2015–present Conselheira de Portugal no Mundo, Conselho da Diáspora Portuguesa
- 2014 University Professor, Carnegie Mellon University
- 2012 Doutor Honoris Causa, Universidade Nova de Lisboa (Portugal)
- 2012 Seeds of Science Prize, Ciência Hoje, Portugal
- 2012 Fellow of the American Mathematical Society
- 2012 SIAM (Society for Industrial and Applied Mathematics) President Elect 2012, SIAM President 2013, 2014, SIAM Past President 2015
- 2011 Congratulatory vote, unanimously approved by the Portuguese Parliament in plenary session.
- 2009 Best Paper Award 2009, Institute of Information Theory and Automation, Academy of Sciences of the Czech Republic: *Oscillations and Concentrations Generated By A-Free Mappings and Weak Lower Semicontinuity of Integral Functionals* ESAIM:COCV, Published online April 21, 2009
- 2009 Fellow of the Society for Industrial and Applied Mathematics
- 2006 AWM-SIAM Sonia Kovalevsky Lecturer for 2006, SIAM Annual Meeting, Boston
- 2004 Women of Distinction Award in Math and Technology
- 2003 Mellon College of Science Professor of Mathematics (Chair)
- 1997 Grand Officer of the Military Order of Saint James of the Sword, Grande Oficial da Ordem Militar de Sant'Iago da Espada (Portuguese Decoration)
- 1981-1985 Calouste Gulbenkian Fellowship
- 1981-1985 Fullbright Fellowship

## ACADEMIC POSITIONS:

- 2003–present Mellon College of Science Professor of Mathematics (Chair)
- 1998–present Director of the Center for Nonlinear Analysis (CNA), Department of Mathematical Sciences, Carnegie Mellon University
- 1993–present Professor of Mathematics, Carnegie Mellon University
- 1992–93 Associate Professor with Tenure, Carnegie Mellon University
- 1989–92 Assistant Professor, Carnegie Mellon University
- 1987–89 Visiting Assistant Professor, Carnegie Mellon University
- 1986–87 Postdoctoral fellow at the Centre de Mathématiques Appliquées, Ecole Polytechnique, Palaiseau, France
- 1986–87 Assistant Professor on leave from the University of Lisbon
- 1985–86 Assistant Professor in the University of Lisbon
- 1981–85 Teaching Assistant at the University of Minnesota
- 1980–81 Teaching Assistant at the University of Lisbon

## PROFESSIONAL SOCIETIES:

- American Association for the Advancement of Science (AAAS)
- American Mathematical Society (AMS)
- Mathematical Association of America (MAA)
- International Society for the Interaction of Mechanics and Mathematics
- Society for Industrial and Applied Mathematics (SIAM)
- Sociedade Portuguesa de Matemática
- Society for Natural Philosophy

## EDITORIAL BOARDS:

- De Gruyter Series in Applied and Numerical Mathematics
- Advances in Calculus of Variations, de Gruyter, Berlin- New York
- Archive for Rational Mechanics and Analysis
- BCAM-Springer Briefs
- CIM Series in Mathematical Sciences (CIM-MS), Springer-Verlag
- ESAIM: COCV (European Series in Pure and Applied Mathematics, Control, Optimization and Calculus of Variations), SMAI, Associate Editor
- Evolution Equations and Control Theory (EECT), AIMS (American Institute of Mathematics and Sciences)
- Infosys Science Foundation Series in Mathematical Sciences, Book Series, Springer, Editor-in-Chief
- Journal of Nonlinear Science, Springer
- Le Journal de l'Ecole Polytechnique
- Mathematical Association of America (MAA)
- M<sup>3</sup>AS, Mathematical Models and Methods in Applied Sciences
- Monography Series of the SPM
- Portugaliae Matematica, Springer
- Ricerche di Matematica, Springer
- SIAM Journal on Mathematical Analysis
- 2011-2016 SIAM Review (SIREV, Survey and Review Section)

## COMMITTEES AND PANELS EXTERNAL TO CMU:

- 2014-2022 AAAS, Member-at-Large of the Section of Mathematics
  - 2018 Selection Committee, Simons Foundation –Simons Investigators in Mathematics, Physics, Astrophysics, Theoretical Computer Science, Math+X, and Mathematical Modeling of Living Systems (MMLS)
- 2018-2019 Founding Committee of the Research Institute for Mathematics (RIM), Milan (Italy)
- 2017-2020 Alan T. Waterman (ATW) Award Committee, NSF
- 2017-2019 Abel Prize Committee
- 2017-2019 Board of Electors to Professorships, University of Cambridge (UK)
- 2017-2019 Scientific Advisory Board (SAB) of the Max Planck Institute for Mathematics in the Sciences, Leipzig (Germany), Chair
- 2017-2020 AMS Fellows Selection Committee
- 2017-2020 Mathematics Research Communities Advisory Board, AMS
- 2008-2019 SIAM Committee on Science Policy
- 2014-present Juror for the Infosys Prize in Mathematical Sciences, Infosys Foundation, India
  - 2014-2018 Interdisciplinary Center of Scientific Computing (IWR), Scientific Advisory Board, Heidelberg, Germany
  - 2014-2018 IMA Board of Governors
  - 2016-2018 2018 ICM Emmy Noether Lecture Committee, Chair
  - 2016-2019 AWM (Association for Women in Mathematics) Scientific Advisory Committee
  - 2016-2017 Comissão de Visita de Apreciação das Atividades de Investigação e Ensino do Departamento de Matemática, Instituto Superior Técnico, Portugal
  - 2016-2022 Scientific Advisory Board (Comissão de Acompanhamento), Centro de Matemática, Aplicações Fundamentais e Investigação Operacional (CMAF-CIO), University of Lisbon, Portugal
  - 2016-2019 National Advisory Committee (NAC) for the Statistical and Applied Mathematical Sciences Institute (SAMSI)
  - 2016-2022 Scientific Advisory Board (Comissão de Acompanhamento), Centre for Mathematics of the University of Coimbra (CMUC), Portugal
  - 2016-2020 Scientific Advisory Board, Faculty of Mathematics, University of Vienna, Austria
    - 2016 Review panel of the Mathematical Institute, University of Oxford (UK)
  - 2016-2019 AMS Short Course Subcommittee
  - 2014-2017 Advisory Committee of the Centrality of Digitally-Enabled Science (CADENS), National Center for Supercomputing Applications (NCSA)
    - 2016 Evaluation panel of the Faculty of Mathematics at the University of Vienna, Chair
    - 2016 Nominating Committee, SIAM Activity Group on Mathematical Aspects of Materials Science (SIAG/MS)
    - 2016 Ten-Year Review Committee of the Department of Mathematics, University of Washington
- 2014-2015 External Review Committee of the Center for Scientific Computation and Mathematical Modeling (CSCAMM) at the University of Maryland
- 2014-2016 National Center for Supercomputing Applications (NCSA), University of Illinois, Advisory Committee
  - Fall 2013 Mathematics Department at the University of Texas at Austin, External Review Committee, Fall 2013
- 2013-2015 International Advisory Panel of the Skolkovo Institute of Science and Technology
- 2012-2013 Chair of the Search Committee for Division Director of DMS at the NSF
  - Fall 2012 Member of the review panel for the Collaborative Research Center on “Mathematics of Emergent Effects”, U. Bonn (Germany)
- 2011-present Conselho para a Ciência e Tecnologia, Fundação Francisco Manuel dos Santos (FFMS)

- 2005-present President of the Scientific Committee of CIM (Centro Internacional de Matemática)
- 2011-2016 Member of the Scientific Advisory Board of the Max Planck Institute for Mathematics in the Sciences in Leipzig, Germany
- 2010-2012 Member of the NSF Facilities Committee
- 2010-2012 Member of the NSF International Materials Institute for Solar Energy and Environment (IMI-SEE)
- 2009-2011 Member of the NSF MPS Energy Working Group  
International Scientific Advisory Committee of the Centre of Excellence in Mathematics, Mahidol University, Thailand
- 2009-2010 Search Committee for the Director of the NSF Division of Mathematical Sciences
- 2009 SIAM Fellows Selection Committee
- 2009-2011 AMS Nominating Committee
- 2008 External Review Committee, Purdue University
- 2008-2010 SIAG (SIAM Activity Group) on "Mathematical Aspects of Materials Science" (SIAM), Vice-Chair
- 2008-2013 Appointed by the Portuguese Council of Ministers to the Board of Trustees of the Portuguese National Agency for the Evaluation and Accreditation of Higher Education in Portugal
- 2008-2011, 2012-2015 NSF Mathematics and Physical Sciences Directorate Advisory Committee (MPSAC)  
Scientific Council of IMDEA (Institutos Madrileños de Estudios Avanzados-Madrid Institute of Advanced Studies) <http://www.imdea.org>
- 2007-2010 Interdisciplinary Adjudication Committee, Canada Research Chairs Program
- 2010-2012 SIAM Council for a three-year period beginning Jan. 1, 2007 and ending Dec. 31, 2009. Re-elected
- 2006-2009 Representative to AMS-IMS-SIAM Evaluation Panel for the NSF Mathematical Sciences Postdoctoral Research Fellowships
- 2006 External reviewer of the Department of Mathematics at Simon Fraser University  
Site Visit Committee for the Banff International Research Station (BIRS)  
President of the FIIP (Forum Internacional de Investigadores Portugueses)  
President of the Scientific Committee of CIM (Centro Internacional de Matemática, Portugal)  
Advisory Board of the University of Trento (Italy)  
Advisory Board of EPFL, Lausanne, Switzerland  
NSF (National Science Foundation) Panels of evaluation of research proposals in the area of Applied Mathematics, NSF Panels of evaluation of research proposals in the area of mechanics, NSF Panels of evaluation of FRG proposals (Focus Research Groups), NSF Advisory Panels, NSF Panels of evaluation of institutes and RTGs  
FCT (Fundação para a Ciência e Tecnologia, the Portuguese NSF) Coordinator of the evaluation of all Portuguese research centers, institutes, group and individual research proposals in the area of Mathematics since 1994  
Evaluation Panels for the Italian MURST

---

## COMMITTEES AND OTHER SERVICE IN CMU:

- 2017-2018 Presidential Search Committee
- 2017 Department of Mathematical Sciences Plan/Planning Committee
- 2017 Presidential Review Committee
- 2016-2017 Search Committee for Tenure Track Positions in Mathematics of Finance
- 2015-2017 Department of Mathematical Sciences Executive Committee

- 2015-2016 Search Committee for Tenure Track Positions in Probability
- 2015-2016 MCS Dean Search Committee (Co-Chair)
- 2014-2015 University Strategic Planning: Committee on Research, Creativity, Innovation and Entrepreneurship, International Strategic Planning Working Group
- 2014-2015 Search Advisory Committee for CMU's Provost
- 2014-2017 CMU Budget and Financial Affairs Committee
- 2013-2015 CMU Research Review Committee
- 2012-2013 CMU President Search Committee
- 2011-2012 Department Head Search Committee (Chair)
- 2007-2009 University International Strategic Planning Committee
  - 2007-09 University Research Strategic Planning Committee
  - 2007-08 Advisory Board Preparatory Committee
  - 2007-08 MCS Dean Search Committee
- 2001-02, 2003-03 Committee to Revise the Department of Mathematical Sciences Strategic Plan
- 2001-02 Mellon College of Science Faculty Organization (Chair)
- 2000–present CMU International Committee
  - 2000-01 Mellon College of Science Dean Search Committee
- 1999-present Search Committee (Chair, Tenure Track Applied Analysis)
  - Department Head Search Committees (Physics and Mathematical Sciences), 1998-1999, 2000-01, 2002-03, 2011-2012 (Chair)
- 1992-2000 Mellon College of Science Planning Committee
- 1998-2000 CMU Advisory Committee for Technology
- 1997-present Department Head Advisory Committee
  - 1994-1997 Mellon College of Science Associate Dean for Faculty and Graduate Affairs

## GRADUATE STUDENTS:

Adrian Hagerty 2015-present.

- Ph.D. 2017 Pan Liu, Cambridge University (UK).
- Ph.D. 2017 Matteo Rinaldi, co-supervised with Giovanni Leoni.
- Ph.D. 2015 Laura Bufford, Epic Corp.
- Ph.D. 2012 Paolo Piovano, co-supervised with Giovanni Leoni. University of Vienna (Austria).
- PhD 2011 Rita Ferreira, Graduate student in the ICTI CMU-Portugal program in Applied Mathematics, co-supervised with Luisa Mascarenhas. KAUST (Saudi Arabia).
- Ph.D. 2008 Bernardo Sousa, co-supervised with Giovanni Leoni. University of Toronto (Canada).
- Ph.D. 2007 Graça Carita, co-supervised with Giovanni Leoni. University of Évora (Portugal). Deceased.
- Ph.D. 2005 Margarida Baia, Instituto Superior Técnico (Lisbon, Portugal).
- Ph.D. 2004 Cristina Popovici, Loyola University Chicago.
  - PhD 2004 Marian Bocea, Loyola University Chicago.
- Ph.D. 2003 Pedro Santos, Instituto Superior Técnico (Lisbon, Portugal).
- Ph.D. 1996 Christopher Larsen, Worcester Polytechnic Institute.
- Ph.D. 1994 Ana Cristina Barroso, University of Lisbon (Portugal).

## MENTOR OF POSTDOCTORAL FELLOWS:

- 2017-2020 Stephan Wojtowytsch, CNA postdoc. Co-mentored with Giovanni Leoni.
- 2017-2020 Ethan O'Brien, CNA postdoc. Co-mentored with Giovanni Leoni.
- 2015-2018 Riccardo Cristoferi, CNA postdoc.
- 2016-2019 Janusz Ginster, PIRE and CNA postdoc. Co-mentored with Giovanni Leoni.
- 2015-2018 Lei Wu, PIRE postdoc. Co-mentored with Giovanni Leoni and Ian Tice.
- 2016-2017 Peter Gladbach. Co-mentored with Giovanni Leoni. Postdoctoral Fellow at the Max-Planck Institute for Mathematics in the Sciences, Leipzig (Germany)
- 2015-2017 Laurent Dietrich, PIRE and CNA postdoc, co-mentored with Giovanni Leoni and David Kinderlehrer. Faculty member at the University of Metz/Nancy (France).
- 2015-2017 Marco Carocchia, CMU|Portugal postdoc, co-mentored with Giovanni Leoni. Instituto Superior Técnico, Lisbon (Portugal).
- 2014-2016 Emanuel Indrei, Assistant Professor at Purdue University. Co-mentored with Giovanni Leoni.
- 2014-2015 Xin Yang Lu, Postdoctoral Fellow at McGill University (Montreal, Canada). Co-mentored with Giovanni Leoni and Dejan Slepčev.
- 2012-2015 Elisa Davoli, Postdoctoral Fellow at U. Vienna, Austria.
- 2011-2014 Timothy Blass, Data Scientist at Capital One. Co-mentored with Giovanni Leoni and David Kinderlehrer.
- 2011-2014 Gurgen Hayrapetyan, Assistant Professor at Ohio University. Co-mentored with Giovanni Leoni.
- 2011-2014 Marco Morandotti, Technical University of Munich (TUM), Munich (Germany). Co-mentored with Giovanni Leoni.
- 2011 Michael Goldman, junior CNRS researcher at Paris VI (France). Co-mentored with Giovanni Leoni.
- 2010-2012 Barbara Zwicknagl, University of Würzburg (Germany).
- 2010-2012 Carolin Kreisbeck, Assistant Professor at the University of Utrecht (Germany).
- 2009 Milena Chermisi, Industrial position in Milan (Italy).
- 2008-2010 Stefan Krömer, Academy of Sciences, Prague (Czech Republic).
- 2007-2009 Filippo Cagnetti, University of Sussex (UK).
- 2007-2009 Marco Barchiesi, University of Naples (Italy).
- Ana Margarida Ribeiro, CMU|Portugal Program in Applied Mathematics, University Nova (Portugal).
- Vincent Millot, University Paris VI (France).
- Valeriy Slastikov, University of Bristol (UK).
- Massimiliano Morini, University of Parma (Italy).
- Marc-Oliver Rieger, University of Zürich (Germany).
- Roberto Alicandro, University of Cassino (Italy).
- Chiara Leone, University of Naples (Italy).
- Fabio Bagagiolo, University of Trento (Italy).
- Roberto Paroni, University of Sassari (Italy)
- Misha Shvartsman, St. Thomas College, Minnesota.
- Rustum Choksi, McGill University (Montreal, Canada).
- Georg Dolzmann, Regensburg University (Germany).
- Giovanni Leoni, Carnegie Mellon University.
- Konstantina Trivisa, University of Maryland
- Markos Katsoulakis, University of Massachusetts.

Wilfrid Gangbo, UCLA.

Piotr Rybka, Warsaw University (Poland).

## BOOKS AND LECTURE NOTES:

1. I. Fonseca and G. Leoni, *Modern Methods in the Calculus of Variations:  $W^{1,p}$  spaces*. In preparation. To be published by Springer-Verlag.
2. I. Fonseca and G. Leoni, chapter on Calculus of Variations in the book *Princeton Companion to Applied Mathematics*, to appear.
3. I. Fonseca and G. Leoni, *Modern Methods in the Calculus of Variations:  $L^p$  Spaces*. Springer-Verlag, 2007.
4. 2001 CNA Summer School Lecture Notes: Higher Order Variational Problems (<http://www.math.cmu.edu/public/cna/publications.html>)
5. I. Fonseca and W. Gangbo, *Degree Theory in Analysis and Applications*. Oxford University Press, 1995.

## PUBLICATIONS IN JOURNALS:

See MathSciNet and <http://www.math.cmu.edu/cna/publications.html>.

1. Ferreira, R., I. Fonseca, and M. L. Mascarenhas, "A Chromaticity-Brightness Model for Color Images Denoising in a Meyer's "u+v" Framework", *Calc. Var. Partial Differential Equations* **56** (2017), 56:140.
2. Dacorogna, B., I. Fonseca and G. Giuseppe, "The various stages of Nicola Fusco". *Nonlinear Anal.* **153** (2017), 2–6.
3. Fonseca, I., G. Leoni and M. Morini, "Equilibria and dislocations in epitaxial growth". *Nonlinear Anal.* **154** (2017), 88–121.
4. Fonseca, I., G. Hayrapetyan, G. Leoni and B. Zwicknagl, "Domain formation in membranes near the onset of instability". *J. Nonlinear Sci.* **26** (2016), 1191–1225.
5. Davoli, E. and I. Fonseca, "Periodic homogenization of integral energies under space-dependent differential constraints". *Port. Math.* **73** (2016), 279–317.
6. Davoli, E. and I. Fonseca, "Homogenization of Integral Energies Under Periodically Oscillating Differential Constraints", *Calc. Var. Partial Differential Equations* **55** (2016), 55–69.
7. Fonseca, I., G. Leoni, and X. Y. Lu, "Regularity in Time for Weak Solutions of a Continuum Model for Epitaxial Growth with Elasticity on Vicinal Surfaces", *Comm. Partial Differential Equations* **40** (2015), 1942–1957.
8. Dal Maso, G., I. Fonseca and G. Leoni, "Second Order Asymptotic Development for the Anisotropic Cahn-Hilliard Functional", *Calc. Var. Partial Differential Equations* **54** (2015), 1119–1145.
9. Bufford, L. and I. Fonseca, "A Note on Two Scale Compactness for  $p = 1$ ", *Portugaliae Math.* **72** (2015), 101–117.
10. Bufford, L., E. Davoli and I. Fonseca, "Multiscale Homogenization in Kirchhoff's Nonlinear Plate Theory", *Math. Models Methods Appl. Sci.* **25** (2015), 1765–1812.
11. Fonseca, I., N. Fusco, G. Leoni and M. Morini, "Motion of Three-Dimensional Elastic Films by Anisotropic Surface Diffusion with Curvature Regularization", *Anal. & PDE* **8** (2015), 373–423.
12. Blass, T., I. Fonseca, G. Leoni and M. Morandotti, "Dynamics for Systems of Screw Dislocations" *SIAM J. Appl. Math.* **75** (2015), 393–419.
13. Fonseca, I, A. Pratelli and B. Zwicknagl, "Shapes of Epitaxially Grown Quantum Dots", *Arch. Ration. Mech. Anal.* **214** (2014), 359–401.

14. Choksi, R., I. Fonseca and B. Zwicknagl, "A Few Remarks on Variational Models for Denoising", *Commun. Math. Sci.* **12** (2014), 843–857.
15. Carozza, M., I. Fonseca and A. Passarelli di Napoli, "Regularity Results for an Optimal Design Problem with a Volume Constraint", *ESAIM Control Optim. Calc. Var.* **20** (2014), 460–487.
16. Dal Maso, G., I. Fonseca and G. Leoni, "Analytical Validation of a Continuum Model for Epitaxial Growth with Elasticity on Vicinal Surfaces", *Arch. Ration. Mech. Anal.* **212** (2014), 1037–1064.
17. Ferreira, R. and I. Fonseca, "Reiterated Homogenization in  $BV$  via Multiscale Convergence", *SIAM J. Math. Anal.* **44** (2012), 2053–2098.
18. Ferreira, R. and I. Fonseca, "Characterization of the Multiscale Limit Associated with Bounded Sequences in  $BV$ ", *J. Convex Anal.* **19** (2012), 403–452.
19. Fonseca, I., N. Fusco, G. Leoni and M. Morini, "Motion of Elastic Thin Films by Anisotropic Surface Diffusion with Curvature Regularization", *Arch. Ration. Mech. Anal.* **205** (2012), 425–466.
20. Chermisi, M., G. Dal Maso, I. Fonseca and G. Leoni, "Singular Perturbation Models in Phase Transitions for Second Order Materials", *Indiana Univ. Math. J.* **60** (2011), 367–409.
21. Fonseca, I., N. Fusco, G. Leoni and V. Millot, "Material Voids in Elastic Solids with Anisotropic Surface Energies", *J. Math. Pures Appl.* **96** (2011), 591–639.
22. Carita, G., I. Fonseca and G. Leoni, "Relaxation in  $SBV_p(\Omega; S^{d-1})$ ", *Calc. Var. Partial Differential Equations* **42** (2011), 211–255.
23. Fonseca, I. and S. Krömer, "Multiple Integrals Under Differential Constraints: Two-Scale Convergence and Homogenization", *Indiana Univ. Math. J.* **59** (2010), 427–457.
24. Fonseca, I., G. Leoni, F. Maggi and M. Morini, "Exact Reconstruction of Damaged Color Images Using a Total Variation Model", *Ann. Inst. H. Poincaré Anal. Non Linéaire* **27** (2010), 1291–1331.
25. Dal Maso, G., I. Fonseca and G. Leoni, "Nonlocal Character of the Reduced Theory of Thin Films with Higher Order Perturbations", *Adv. Calc. Var.* **3** (2010), 287–319.
26. Fonseca, I. and M. Kruzik, "Oscillations and concentrations generated by  $A$ -free mappings and weak lower semicontinuity of integral functionals", *ESAIM Control Optim. Calc. Var.* **16** (2010), 472–502.
27. Bouchitté, G., I. Fonseca and L. Mascarenhas, "The Cosserat Vector in Membrane Theory: A Variational Approach", *J. Convex Anal.* **16** (2009), 351–365.
28. Dal Maso, G., I. Fonseca, G. Leoni and M. Morini, "A Higher Order Model for Image Restoration: The One Dimensional Case", *SIAM J. Math. Anal.* **40** (2009), 2351–2391.
29. Fonseca, I., Fusco, N., Leoni, G., Morini, M., "Equilibrium configurations of epitaxially strained crystalline films: existence and regularity results", *Arch. Ration. Mech. Anal.* **186** (2007), no. 3, 477–537.
30. Fonseca, I., G. Francfort and G. Leoni, Erratum to "Thin elastic films: The impact of higher order perturbations", *Quart. Appl. Math.* **65** (2007), no. 1, 69–98, *Quart. Appl. Math.* **66** (2008), 781–799.
31. Fonseca, I., G. Francfort and G. Leoni, "Thin elastic films: The impact of higher order perturbations", *Quart. Appl. Math.* **65** (2007), 69–98.
32. Baia, M. and I. Fonseca, "The limit behavior of a family of variational multiscale problems", *Indiana Univ. Math. J.* **56** (2007), 1–50.
33. Fonseca, I., M. Morini and V. Slastikov, "Surfactants in foam stability: A phase-field model", *Arch. Rat. Mech. Anal.* **183** (2007), 411–456.



34. Acerbi, E., I. Fonseca and G. Mingione, "Existence and regularity for mixtures of micromagnetic materials", *Proc. R. Soc. Lond. Ser. A Math. Phys. Eng. Sci.* **462** (2006), 2225–2243.
35. Fonseca, I. and C. Popovici, "Coupled singular perturbations for phase transitions", *Asymptot. Anal.* **44** (2005), 299–325.
36. Fonseca, I., J. Malý, "From Jacobian to Hessian: distributional form and relaxation", *Riv. Mat. Univ. Parma (7)* **4** (2005), 45–74.
37. Fonseca, I., G. Leoni and J. Malý, "Weak continuity and lower semicontinuity results for determinants", *Arch. Ration. Mech. Math.* **163** (2005), 411–448
38. Fonseca, I., G. Leoni and R. Paroni, "On Hessian matrices in the space  $BH$ ", *Commun. Contemp. Math.*, **7** (2005), 401–420.
39. Fonseca, I., N. Fusco and Paolo Marcellini, "Topological degree, Jacobian determinant and relaxation", *Boll. Unione Mat. Ital. Sez. B Artic. Ric. Mat.* **8** (2005), 187–250.
40. Bocea, M. and I. Fonseca, "A Young measure approach to a nonlinear membrane model involving the bending moment", *Proc. R. Soc. Edinburgh Sect. A* **134A** (2004), 845–883.
41. Fonseca, I., J. Malý and G. Mingione, "Scalar minimizers with fractal singular sets", *Arch. Ration. Mech. Anal.* **172** (2004), 295–307.
42. Dal Maso, G., I. Fonseca, G. Leoni, M. Morini, "Higher order quasiconvexity reduces to quasiconvexity", *Arch. Ration. Mech. Anal.* **171** (2004), 55–81.
43. Fonseca, I., N. Fusco and P. Marcellini, "On the total variation of the Jacobian", *J. Funct. Anal* **207** (2004), 1–32.
44. Fonseca, I., S. Müller and G. Leoni, " $\mathcal{A}$ -quasiconvexity: weak-star convergence and the gap", *Ann. Inst. H. Poincaré Anal Non Linéaire* **21** (2004), 209–236.
45. Bouchitté, G., I. Fonseca and L. Mascarenhas, "Bending moment in membrane theory", *J. Elasticity* **73** (2003), 1–3.
46. Fonseca, I. and E. Zappale, "Multiscale relaxation of convex functionals", *J. Convex Anal.* **10** (2003), No.2, 325–350.
47. Fonseca, I., G. Leoni and R. Paroni, "On lower semicontinuity in  $BH^p$  and 2-quasiconvexification", *Cal. Var. and Partial Differential Equations* **17** (2003), 283–309.
48. Acerbi, E., G. Bouchitté and I. Fonseca, "Relaxation of convex functionals: The gap problem", *Ann. H. Poincaré, Anal, Non Linéaire* **20** (2003), 359–390.
49. Bocea, M. and I. Fonseca, "Equi-integrability results for 3D-2D dimension reduction problems", *ESAIM Control Optim. Calc. Var.* **7** (2002), 443–470.
50. Conti, S., I. Fonseca and G. Leoni, "A Gamma-convergence result for the two-gradient theory of phase transitions", *Comm. Pure Appl. Math.* **55** **55** (2002), 857–936.
51. Fonseca, I., N. Fusco and P. Marcellini, "An 'existence result for a nonconvex variational problem via regularity", *ESAIM Control Optim. Calc. Var.* **7** (2002), 69–95.
52. Bouchitté, G., I. Fonseca, G. Leoni and L. Mascarenhas, "A global method for relaxation in  $W^{1,p}$  and in  $SBV_p$ ", *Arch. Ration. Mech. Anal.* **165** (2002), 187–242.
53. Bhattacharya, K., I. Fonseca and G. Francfort, "An asymptotic study of the debonding of thin films", *Arch. Ration. Mech. Anal.* **161** (2002), 205–229.

54. Fonseca, I., G. Leoni, J. Malý, and R. Paroni, "A note on Meyers' theorem in  $W^{k,1}$ ", *Trans. Amer. Math. Soc.* **354** (2002), 3723–3741.
55. Brandon, D., I. Fonseca and P. Swart, "Oscillations in a dynamical model of phase transition", *Proc. Roy. Soc. Edinburgh Sect. A* **131A** (2001), 59–81.
56. Fonseca, I. and G. Leoni, "On lower semicontinuity and relaxation", *Proc. Roy. Soc. Edinburgh* **131A** (2001), 519–565.
57. Braides, A., and I. Fonseca, "Brittle thin films", *Appl. Math. Optim.* **44** (2001), 299–323.
58. Dacorogna, B. and I. Fonseca, "A-B quasiconvexity and implicit partial differential equations", *Calc. Var. Partial Differential Equations* **14** (2002), 115–149.
59. Fonseca, I. and G. Francfort, "On the inadequacy of the scaling of linear elasticity for 3D-2D asymptotics in a nonlinear setting", *J. Math. Pures Appl.* **80** (2000), 547–562.
60. Braides, A., I. Fonseca and G. Leoni, "A-quasiconvexity: relaxation and homogenization", *ESAIM Control Optim. Calc. Var.* **5** (2000), 539-577.
61. Bouchitté, G., I. Fonseca and L. Mascarenhas, "Relaxation of variational problems under trace constraints", *Nonlinear Anal.* **49** (2002), 221–246.
62. Braides, A., I. Fonseca and G. Francfort, "3D-2D asymptotic analysis for inhomogeneous thin films", *Indiana Univ. Math J.* **49** (2000), 1367–1404.
63. Dacorogna, B. and I. Fonseca, "Minima absolus pour des energies ferromagnetiques", *C. R. Acad. Sci. Paris Sér. I. Math.* **331** (2000), 497–500.
64. Fonseca, I. and G. Leoni, "Relaxation results in micromagnetics", *Ricerche Mat.* **XLIX** (2000), 269–304.
65. Fonseca, I. and G. Leoni, "Some remarks on lower semicontinuity", *Indiana Univ. Math. J.* **49** (2000), 617–635.
66. Fonseca, I. and C. Mantegazza, "Second order singular perturbation models for phase transitions", *Siam J. Math. Anal.* **31** (2000), 1121 - 1143.
67. Barroso, A. C., I. Fonseca and R. Toader, "A relaxation theorem in the space of functions of bounded deformation", *Ann. Scuola Norm. Sup. Pisa Cl. Sci.* **29** (2000), 19–49.
68. Fonseca, I. and S. Müller, "A-quasiconvexity, lower semicontinuity, and Young measures", *SIAM J. Math. Anal.* **30** (1999), 1355–1390.
69. Dacorogna, B., I. Fonseca, J. Malý, and K. Trivisa, "Manifold constrained variational problems", *Calc. Var.* **9** (1999), 185–206.
70. Ambrosio, L., I. Fonseca, P. Marcellini and L. Tartar, "On a Volume-Constrained Variational Problem", *Arch. Ration. Mech. Anal.* **149** (1999), 23–47.
71. Choksi, R., G. Del Piero, I. Fonseca and D. Owen, "Structured deformations as energy minimizers in models of fracture and hysteresis", *Math. Mech. Solids*, **4** (1999), 321–356.
72. Fonseca, I. and G. Francfort, "3D-2D asymptotic analysis of an optimal design problem for thin films", *J. Reine Angew. Math.* **505** (1998), 173–202.
73. Fonseca, I. and G. Leoni, "Bulk and contact energies: nucleation and relaxation", *SIAM J. Math. Anal.* **30** (1999), 190–219.
74. Fonseca, I., S. Müller and P. Pedregal, "Analysis of concentration and oscillation effects generated by gradients", *SIAM J. Math. Anal.*, **29** (1998), 736-756.

75. Fonseca, I., J. Schaeffer and M. Shvartsman, "Oscillations in one-dimensional elasticity with surface energy", *Quart. Appl. Math.* Vol. LVII **3** (1999), 475-499.
76. Bouchitté, G., I. Fonseca and L. Mascarenhas, "A global method for relaxation", *Arch. Rational Mech. Anal.* **145** (1998), 51-98.
77. Bouchitté, G., I. Fonseca and J. Malý, "The effective bulk energy of the relaxed energy of multiple integrals below the growth exponent", *Proc. Roy. Soc. Edinburgh* **128A** (1998), 463-479.
78. Acerbi, E., I. Fonseca, I. and N. Fusco, "Regularity of minimizers for a class of membrane energies", *Ann. Scuola Norm. Sup. Pisa Cl. Sci.* **27** (1997), 11-25 (volume dedicated to E. De Giorgi).
79. Fonseca, I. and J. Malý, "Relaxation of multiple integrals below the growth exponent", *Ann. Inst. H. Poincaré, Anal. Non Linéaire* **14** (1997), 309-338.
80. Fonseca, I. and N. Fusco, "Regularity results for anisotropic image segmentation models", *Ann. Scuola Norm. Sup. Pisa Cl. Sci.* Issue 3, **24** (1997), 463-499.
81. Choksi, R. and I. Fonseca, "A change of variables formula for mappings in  $BV$ ", *Proc. Amer. Math. Soc.* **125** (1997), 2065-2072.
82. Acerbi, E., I. Fonseca and N. Fusco, "Regularity results for equilibria in a variational model for fracture", *Proc. Roy. Soc. Edinburgh* **127A** (1997), 889-902.
83. Choksi, R. and I. Fonseca, "Bulk and interfacial energy densities for structured deformations of continua", *Arch. Rational Mech. Anal.* **138** (1997), 37-103.
84. Fonseca, I. and P. Marcellini, "Relaxation of multiple integrals in subcritical Sobolev spaces", *J. Geom. Anal.* **7** **1** (1997), 57-81.
85. Barroso, A. C., G. Bouchitté, G. Buttazzo and I. Fonseca, "Relaxation of bulk and interfacial energies", *Arch. Rational Mech. Anal.* **135** (1996), 107-173.
86. Ambrosio, L., G. Buttazzo and I. Fonseca, "Lower semicontinuity problems in Sobolev spaces with respect to a measure", *J. Math. Pures Appl.* **75** (1996), 211-224.
87. Fonseca, I. and G. Francfort, "Relaxation in  $BV$  versus quasiconvexification in  $W^{1,p}$ : a model for the interaction between fracture and damage", *Calc. Var. Partial Differential Equations* **3** (1995), 407-446.
88. Fonseca, I. and M. Katsoulakis, " $\Gamma$ -convergence, minimizing movements and generalized mean curvature evolution", *Differential Integral Equations* **7** (1995), 1619-1656.
89. Fonseca, I. and W. Gangbo, "Local invertibility of Sobolev functions", *SIAM J. Math. Anal.* **26** (2) (1995), 280-304.
90. Fonseca, I., D. Kinderlehrer and P. Pedregal, "Energy functionals depending on elastic strain and chemical composition", *Calc. Var. Partial Differential Equations* **2** (1994), 283-313.
91. Barroso, A. C. and I. Fonseca, "Anisotropic singular perturbations - the vectorial case", *Proc. Roy. Soc. Edinburgh Sect. A* **124A** (1994), 527-571.
92. Fonseca, I. and S. Müller, "Relaxation of quasiconvex functionals in  $BV(\Omega, \mathbb{R}^p)$  for integrands  $f(x, u, \nabla u)$ ", *Arch. Rational Mech. Anal.* **123** (1993), 1-49.
93. Fonseca, I. and P. Rybka, "Relaxation of multiple integrals in the space  $BV(\Omega; \mathbb{R}^p)$ ", *Proc. Roy. Soc. Edinburgh Sect. A* **121A** (1992), 321-348.
94. Fonseca, I. and G. Parry, "On a class of invariant functionals", *Proc. Roy. Soc. London Ser. A* **436 A** (1992), 317-329.

95. Dacorogna, B. and I. Fonseca, "A minimization problem involving variation of the domain", *Comm. Pure Appl. Math.* **Vol. XLV** (1992), 871-897.
96. Fonseca, I. and G. Parry, "Equilibrium configurations of defective crystals", *Arch. Rational Mech. Anal.* **120** (1992), 245-283.
97. Fonseca, I., "Lower semicontinuity of surface energies", *Proc. Roy. Soc. Edinburgh Sect. A* **120A** (1992), 99-115.
98. Fonseca, I. and S. Müller, "A uniqueness proof for the Wulff theorem", *Proc. Roy. Soc. Edinburgh Sect. A* **119A** (1991), 125-136.
99. Fonseca, I. and S. Müller, "Quasi-convex integrands and lower semicontinuity in  $L^1$ ", *SIAM J. Math. Anal.* **23** (1992), 1081-1098.
100. Fonseca, I., "The Wulff theorem revisited", *Proc. Roy. Soc. London Ser. A* **A 432** (1991), 125-145.
101. Fonseca, I., "Phase transitions of elastic solid materials", *Arch. Rational Mech. Anal.* **107** (1989), 195-223.
102. Fonseca, I. and L. Tartar, "The displacement problem for elastic crystals", *Proc. Roy. Soc. Edinburgh Sect. A* **113 A** (1989), 159-180.
103. Fonseca, I. and L. Tartar, "The gradient theory of phase transitions for systems with two potential wells", *Proc. Roy. Soc. Edinburgh Sect. A* **111 A** (1989), 89-102.
104. Fonseca, I., "Interfacial energy and the Maxwell rule", *Arch. Rational Mech. Anal.* **106** (1989), 63-95.
105. Fonseca, I., "The lower quasiconvex envelope of the stored energy function for an elastic crystal", *J. Math. Pures Appl.* **67** (1988), 175-195.
106. Fonseca, I., "Variational methods for elastic crystals", *Arch. Rational Mech. Anal.* **97** (1987), 189-220.

#### ARTICLES ACCEPTED FOR PUBLICATION:

1. Carozza, M., I. Fonseca and A. Passarelli di Napoli, "Regularity Results for an Optimal Design Problem with Quasiconvex Bulk Energies". To appear in *Calc. Var. Partial Differential Equations*.
2. Dal Maso, G., I. Fonseca and G. Leoni, "Asymptotic Analysis of Second Order Nonlocal Cahn-Hilliard-Type Functionals". To appear in *Trans. Amer. Math. Soc.*
3. Davoli, E. and I. Fonseca, "Relaxation of  $p$ -Growth Integral Functionals Under Space-Dependent Differential Constraints". To appear in Springer Indam Proceedings.
4. Fonseca, I., N. Fusco, M. Morini and G. Leoni, "A model for dislocations in epitaxially strained elastic films". To appear in *J. Math. Pures Appl.*
5. Fonseca, I. and P. Liu, "The weighted Ambrosio-Tortorelli approximation scheme". To appear in *SIAM J. Math. Anal.*

#### ARTICLES SUBMITTED FOR PUBLICATION:

1. Cristoferi, R. and I. Fonseca, "Pircewise Constant Reconstruction of Damaged Color Images". Submitted to *ESAIM Control Optim. Calc. Var.*
2. Fonseca, I., G. Leoni and M. G. Mora, "A second order minimality condition for water-waves functionals". Submitted to *Ann. Scuola Norm. Sup. Pisa Cl. Sci.*

#### PUBLICATIONS IN PROCEEDINGS, REPORTS:

1. Fonseca, I. and G. Leoni, "Surface evolution of elastically stressed films", Proceedings of the 11th AIMS Conference on Dynamical Systems and Differential Equations, Orlando, 2016. Accepted.

2. Fonseca, I. and J. Malý, "Trends in the calculus of variations", *From Jacobian to Hessian: Distributional Form and Relaxation, Proceedings* (Parma 15th-18th September 2004), *Rivista di Matematica della Università di Parma*, **4** (2005), 45–74.
3. Acerbi, E., I. Fonseca and G. Mingione, "A model for mixtures of micromagnetic materials allowing existence and regularity", *Progress in Nonlinear Differential Equations* **35** (2002), 1–8, Birkhäuser, Basel.
4. Fonseca, I., and G. Leoni, "Higher order variational problems and phase transitions in nonlinear elasticity", in *Progress in Nonlinear Differential Equations and Their Applications*, Birkhäuser.
5. Davis, M., I. Fonseca and M. Grötschel, "The impact of mathematical research on industry and vice-versa", *Proceedings of the Third European Congress of Mathematics*, Barcelona, Spain, July 2000.
6. Irene Fonseca, J. Schaeffer and M.M. Shvartsman, "Creation and propagation of oscillations in one dimensional elasticity with surface energy", *Proceedings Macau*, 1998.
7. Fonseca, I. and J. Malý, "Remarks on the determinant in nonlinear elasticity and fracture mechanics", in *Applied Nonlinear Analysis*, volume in honour of J. Nečas on his 70th birthday, Plenum Press (Kluwer Academic Press), 1999.
8. Fonseca, I., "Materials instabilities and image segmentation: new trends in PDEs and in the calculus of variations", *Proceedings of the Second Euroconference and International Symposium on Material Instabilities*, Thessaloniki, August 31 - September 5 1997.
9. Fonseca, I., "Regularity and optimal design results for elastic membranes", *Proceedings of the Journées Michel Artola*, Bordeaux, November 6-7, 1998.
10. Fonseca, I., "Variational techniques for problems in materials science", in *Progress in Nonlinear Differential Equations and Their Applications*, **25**, Birkhäuser, Verlag-Basel, 1996.
11. Fonseca, I., "Variational methods in materials sciences", in *Proceedings of the conference on Smart Structures and Materials*, SPIE, Orlando, Florida, 13-18 April, 1994.
12. Fonseca, I., "Lower semicontinuity of energy functionals depending on elastic strain and chemical composition", in *Proceedings of Calculus of Variations, Homogenization and Continuum Mechanics* CIRM, Marseille-Luminy, 21-25 June 1993
13. Fonseca, I. and G. Parry, "Variational models for crystals with defects", in *Defects and an elasticity in the Characterization of Crystalline Solids* (L. M. Brock ed.), **AMD -Vol. 148**, 1992.
14. Fonseca, I., D. Kinderlehrer and P. Pedregal, "Relaxation in  $BV \times L^\infty$  of functionals depending on strain and composition", *Boundary Value Problems for Partial Differential Equations and Applications*, dedicated to Enrico Magenes, J. L. Lions and C. Baiocchi eds., Masson, Paris, 1993.
15. Brandon, D., I. Fonseca and P. Swart, "Dynamics and oscillatory microstructure in a model of displacive phase transformations", *Proceedings of the 1993 Metz Days*, Pittman Research Notes in Mathematics.
16. Fonseca, I. and G. Parry, "Variational problems for crystals with defects", *Proceedings of the IMA Workshop on Microstructure and Phase Transition*, Nov. 12-16, 1990 (eds. David Kinderlehrer, Richard James and Mitchell Luskin).
17. Fonseca, I. and G. Parry, "Remarks on variational problems for defective crystals". Report of Dept. of Mathematics, Carnegie Mellon University.
18. Davini C., I. Fonseca and G. Parry, "Variational problems in defective crystals", *Proceedings of the Conference on Phase Transitions and Plastic Like Behavior of Materials*, Grenoble, August, 1991.
19. Fonseca, I., "Remarks on phase transitions", in *Recent Advances in Nonlinear Elliptic and Parabolic Problems*, (Benilan, Chipot, Evans, Pierre, eds.), Longman, 1989.

20. Fonseca, I., "Stability of elastic crystals", in *Non-Classical Continuum Mechanics*, (Knops, R. J. and Lacey, A. A. eds.), Cambridge Uni. Press, 1987, 187-196.

## COLLABORATORS DURING THE LAST 48 MONTHS INCLUDE:

Timothy Blass (Industry)  
Laura Bufford (Epic Corp.)  
Graça Carita (U. Évora, Portugal)  
Menita Carozza (U. Sannio, Italy)  
Milena Chermisi (Milan-industry, Italy)  
Rustum Choksi (McGill, Canada)  
Gianni Dal Maso (SISSA, Italy)  
Elisa Davoli (U. Vienna Austria)  
Rita Ferreira (KAUST)  
Giles Francfort (U. Paris-Nord, France)  
Nicola Fusco (U. Naples, Italy)  
Greg Hayrapetyan (Ohio U.)  
Tom Hudson (U. Oxford, UK)  
Martin Kruzik (Academy of Sciences, Czech Republic)  
Robert Jerrard (U. Toronto, Canada)  
Giovanni Leoni (CMU)  
Xin Yang Lu (McGill, Canada)  
Luisa Mascarenhas (U. Nova de Lisbon, Portugal)  
José Matias (IST, Portugal)  
Maria Giovanna Mora (U. Pavia, Italy)  
Marco Morandotti (SISSA, Italy)  
Massimiliano Morini (University of Parma, Italy)  
Antonia Passarelli di Napoli (U. Naples, Italy)  
Aldo Pratelli (U. Erlangen, Germany)  
Ana Margarida Ribeiro (U. Nova de Lisboa, Portugal)  
Elvira Zappale (U. Salerno, Italy)  
Barbara Zwirnagl (U. Bonn, Germany)

## EDUCATION AND OTHER ACTIVITIES:

Since 1998, Fonseca has been the Director of the NSF Center for Nonlinear Analysis (CNA, DMS 9803791) in Carnegie Mellon University. The activities of the CNA may be found at <http://www.math.cmu.edu/cna/index.html>. These include maintaining a series of scientific reports, weekly seminars, weekly working groups, a visitors' program, the organization of conferences, workshops and summer schools, networking with other research institutions in the US and abroad, and developing mobility, interchange, and internationalization programs for CNA trainees and research faculty.

## SYNERGISTIC ACTIVITIES

Internationalization and bridging with other research groups and institutions are key to keep abreast of recent developments in applied analysis, to be in position to identify cutting-edge mathematical questions, and to be a worldwide asset in the training of postdoctoral fellows and graduate students, cognizant of research opportunities at the interface between mathematical and physical sciences and engineering. As Director of the CNA since 1998, Fonseca is actively engaged in searching for new opportunities, facilitating already existing collaborations, and fostering

the building of new bridges across different institutions in the US and in Europe, thus guaranteeing and securing its reputation as a national and worldwide asset in the education and training of a new generation of researchers who will be at the forefront of mathematics, well informed and well positioned to respond to mathematically challenging areas of materials science, solid state physics, and biotechnology. With these partnerships the CNA seeks to facilitate already existing collaborations and to search for new opportunities including co-organization of conferences and workshops, co-organization of summer schools, mobility for postdocs and advanced graduate students.

- Fonseca is the PI of the 5 million dollars/5 year award of the National Science Foundation funded PIRE (Partnerships for International Research and Education) on "Science at the Triple Point Between Mathematics, Mechanics and Materials Science" (<http://www.math.cmu.edu/PIRE/>) . Many contemporary problems in new advanced materials relate to variation in length, time scales, and variations inherent in their fabrication and function. Resolution of these problems requires predictive theories for these complex systems that in turn require advances in mathematics. In this PIRE project an international network of prominent mathematicians from four U.S. institutions, five European institutions, and a multinational industrial partner, will build on decades of collaboration and training at the interface of mathematics and materials sciences that have yielded many achievements at the forefront of sophisticated new mathematics and simulation methods. The project will focus on four principal research areas: 1. Pattern formation from energy minimization, 2. Challenges in atomistic continuum modelling and computing, 3. Prediction of hysteresis (system that have "memory" such that effects of stimuli are temporally delayed), and 4. Pattern dynamics and development of material microstructure.

Collaborators on this PIRE project include four U.S. institutions: Carnegie Mellon University (PA), California Institute of Technology, New York University, and University of Minnesota; six European institutions: University of Antwerp (Belgium), University of Bonn (Germany), Max Planck Institute for Mathematics in the Sciences (Germany), International School for Advanced Studies (SISSA)(Italy), University of Oxford (UK), and the University of Warwick (UK); and an industrial partner: Robert Bosch GmbH (Germany and USA).

- International School for Advanced Studies (SISSA) in Trieste. This is an exchange agreement of faculty and trainees with the SISSA in Trieste, beginning in 2005 and renewed in 2011 and in 2016.

The CNA and the SISSA are now partners in the recently NSF awarded PIRE on *Science at the Triple Point Between Mathematics, Mechanics and Materials Science*. See

<http://www.math.cmu.edu/PIRE/index.html>

- The Max Planck Institute for Mathematics in the Sciences in Leipzig (Germany), the Mathematical Institute at the University of Oxford (UK), and the University of Bonn together with the Hausdorff Center for Mathematics in Bonn (Germany), have re-structured previous interchange agreements with the CNA through the current CNA NSF PIRE award on "Science at the Triple Point Between Mathematics, Mechanics and Materials Science".
- The University of Naples (Italy) and the CNA signed an agreement in 2012 to facilitate the mobility of young researchers between the two institutions.
- In 2012 the Center for Nonlinear Analysis agreed to participate as associate organization in the research project "Mechanics of Complex Materials", managed by the Italian Ministry of Education, University and Research, under the scientific responsibility of Professor Cesare Davini as coordinator of the Research Unit of Udine (Italy). This agreement was also extended to the University of Trento (Italy), under the same grant proposal.

## EXTENDED VISITS, SEMINARS, COLLOQUIA, INVITED PRESENTATIONS:

The Mathematical Design of New Materials, Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, April 14-May 11, 2019

Colloquium, Applied Math and Computational Science, University of Pennsylvania, April 2018

2018 Porcelli Lectures at LSU (3 lectures), April 2018

Virginia Mathematics Lectures (3 lectures), U. Virginia, Spring 2018

Colloquium, Purdue University, May 2017.

Aziz Lectures, University of Maryland, College Park, May 2016.

NJIT, October 2014.  
 Portland State, October 2014.  
 Drexel Distinguish Lecture Series, September 2014.  
 IAS/Park City Mathematics Institute (PCMI) Summer Session on Mathematics and Materials, Utah, June 29–July 19, 2014.  
 University of Akron, Ohio, April 22, 2014.  
 KAUST, Saudi Arabia, March 9-15, 2014.  
 Women in Mathematics Day and the Jean E. Rubin Memorial Lecture, U. Texas at Austin, November 12, 2013.  
 National Center for Mathematics and Interdisciplinary Science (NCMIS) Distinguished Lecture, Beijing (China), May 13, 2013.  
 Harold J. Gay lecturer at WPI, February 1, 2013.  
 Distinguished Women in Mathematics Lecturer, University of Texas at Austin, November 12-13, 2012.  
 Zhejiang University, Distinguished Lecture, November 11, 2011.  
 Universitat Autònoma de Barcelona (Spain), November 4, 2011.  
 CRM-ISM Colloquium, McGill University, Montreal, Canada, March 4, 2011.  
 IMPA, Instituto Nacional de Matemática Pura e Aplicada, Rio de Janeiro, Brazil, March 2010.  
 Cornell University, March 5, 2010.  
 Mahidol University, Chulalongkorn University, Bangkok, Thailand, November 2009.  
 Center for Mathematics and its Applications, The Australian National University, Canberra, Australia, March 2009.  
 University of Minneapolis, Minnesota, May 2008.  
 Washington University, April 2008.  
 Georgia Tech, November 2007.  
 Penn State. October 2007.  
 Centro De Giorgi, Pisa, October 2006.  
 Fields Institute, Toronto, November 2005.  
 University of Salerno, September 2006.  
 CISM Course "Thin elastic structures: theory, applications and computational aspects".  
 Georgia Tech., February 2004.  
 Caltech, February 2003.  
 Oberwolfach, Germany, RIP program. May 2002.  
 Department of Mathematics, U. of Toulon (France), Invited Professor, September 2002.  
 University of Maryland, February 2002.  
 University of Toulon, June 17-30, 2001.  
 University of Parma, Italy, December 2000.  
 Isaac Newton Institute, Cambridge (UK), December 1999.  
 Département de Mathématiques, Université de Toulon (France), Professeur Invitée, June 1998.  
 Mathematical Institute, Oxford (UK), March 7-13, 1998.  
 ETH, Zürich (Switzerland), Department of Mathematics, January 16-23, 1998.  
 Sabbatical leave, *Max-Planck Institute for Mathematics in the Sciences*, 1997-1998.  
 Intensive course on Calculus of Variations. Univesità Degli Studi di Napoli Federico II, June 1-15, 1997.  
 Summer school on Variational Methods in Materials Science: Phase Transitions, Oscillations and Concentrations. University of Jyväskylä (Finland), August 19-23, 1996.  
 Summer school on "Calculus of Variations: Oscillations, Concentrations and Generalized Solutions Applications." University of Évora (Portugal). June 16-July 7, 1996.  
 University Pierre et Marie Curie (Paris VI), Professeur Invitée, May 15-June 15, 1996.  
 University of Tennessee, Knoxville, Tennessee, February 7-11, 1996.



IMA, University of Minnesota, September 16-23, 1995.  
University of Toulon (France), May - June, 1995.  
University of Pisa (Italy), March 13 - 26, 1993.  
Ecole Polytechnique Fédérale de Lausanne, Lausanne (Switzerland), May-June 1992.  
Istituto delle Applicazioni del Calcolo, Rome (Italy), July 7 - 15, 1991..  
University of Lisbon (Fellow of the Gulbenkian Foundation) (Portugal), June 15-July 31, 1991.  
University of Minnesota, November 10-17, 1990.  
MSRI (Berkeley), October 1-13, 1990.  
University of Bath (U. K.), May 1990-July 1990.  
Brown University, October 1989.  
Instituto Superior Técnico de Lisboa (Portugal), July 1989.  
University of Trento, Trento (Italy), July 1988.  
Heriot-Watt University, Edinburgh (G.B), March 24-April 12, 1986.

## PARTICIPATION IN CONFERENCES, WORKSHOPS AND SUMMER SCHOOLS:

*Gradient Flows: Challenges and New Directions*, ICMS, Edinburgh, UK, September 10-14, 2018.  
*Recent Advances in Applied and Computational Mathematics: A Workshop in Memory of Professor Peter Smereka*, University of Michigan's Center for Applied and Interdisciplinary Mathematics, July 18-20, 2018.  
*Nonlocal Interactions: Dislocations and Beyond*, University of Bath, UK, June 11-14, 2018.  
*Tribute to the Memory of Jack Carr*, ICMS, Edinburgh, UK, May 21-22, 2018.  
*Multiscale Modeling Theory and Computation, An International Conference Honoring Professor Mitchell Luskin on the Occasion of his 65th Birthday*, University of Minnesota, Minneapolis, September 23-25, 2017.  
*Special Session on Advances in Analysis and Related Applications*, Mathematical Congress of the Americas 2017 (MCA2017), Montréal, Canada, July 24-28, 2017.  
*SIAM 2017 Annual Meeting*, Pittsburgh, July 10-14, 2017.  
*Analysis of Dislocation Models for Crystal Defects*, BIRS Center of Casa Matematica Oaxaca (CMO), Oaxaca, Mexico, June 25-30, 2017.  
*Firenze-Montecatini-2017 Workshop on Calculus of Variations and PDE's, on the occasion of Paolo Marcellini's 70th Birthday*, Firenze-Montecatini, Italy, June 12-15, 2017.  
*Nonconvexity, Nonlocality and Incompatibility: From Materials to Biology. A Conference in Honor of Lev Truskinovsky's 60th Birthday*, University of Pittsburgh, May 5-7, 2017.  
*Recent Contributions of Women to Partial Differential Equations*, U. Vienna, Austria, November 28-30, 2016.  
*Lecce Conference in the Calculus of Variations and Partial Differential Equations*, Lecce, Italy, October 4-7, 2016.  
*Mathematical Tribute to Ennio De Giorgi*, Pisa, Italy, September 19-23, 2016.  
*11th AIMS Conference*, Orlando, July 1-5, 2016.  
*Entropy Methods, Dissipative Systems, and applications*, Erwin Schrödinger International Institute for Mathematical Physics, Vienna, Austria, June 13-17, 2016.  
*SIAM Conference on Mathematical Aspects of Materials Science, minisymposium on "Microscopic, Mesoscale and Macroscopic Models in Mechanics"*, Philadelphia, May 8-12, 2016.  
*Winter School on Calculus of Variations in Physics and Materials Science*, University of Würzburg (Germany), February 17-19, 2016.

*International Workshop on Calculus of Variations and its Applications, on the Occasion of Luisa Mascarenhas' 65<sup>th</sup> Birthday*, Lisbon, Portugal, December 17-19, 2015.

*SIAM Conference on Analysis of Partial Differential Equations, minisymposium on "PDEs for Defects Problems in Materials Science"*, Scottsdale, Arizona, December 7-10, 2015.

*SIAM Conference on Analysis of Partial Differential Equations, minisymposium on "PDEs in Imaging"*, Scottsdale, Arizona, December 7-10, 2015.

*Mathematics and Mechanics in the 22nd Century: Seven Decades and Counting...*, conference in honor of Jerry Ericksen's 90<sup>th</sup> Birthday, Eugene, Oregon, October 23-25, 2015.

*AMS Special Session on "Nonlinear PDEs and Calculus of Variations"*, Loyola University Chicago, October 3-4, 2015.

*Workshop in Honor of Jan Malý's 60<sup>th</sup> Birthday*, Prague, Czech Republic. September 18-20, 2015.

*Calculus of Variations and Geometric Measure Theory*, University of Sussex, United Kingdom, September 7-9, 2015.

*AMS-EMS-SPM International Meeting*, Plenary Speaker, Porto, June 10-13, 2015.

*Calculus of Variations and Nonlinear Partial Differential Equations*, UT Austin, May 25-29, 2015.

*X Americas Conference on Nonlinear Analysis and Differential Equations*, Buenos Aires, Argentina, Course Lecturer. February 9-13, 2015.

*The 5th International Conference on Scientific Computing and Partial Differential Equations (SCPDE14)*, Hong Kong Baptist University (HKBU), December 8-12, 2014.

*Mathematical and Computational Aspects of Materials Science*, minisymposium of the SIAM Activity group on Mathematical Aspects of Materials Science, MRS Fall Meeting, Boston. Invited presentation. November 30–December 5, 2014.

*Annual Meeting of KSIAM (Korean SIAM)*, Jeju (Korea), November 20-23, 2014.

*Variational Modeling in Solid Mechanics*, Univ. Udine (Italy). Invited presentation. September 22-24, 2014.

*PIRE Workshop on Atomistic and Multi-Scale Models of Materials*, University of Warwick, United Kingdom, September 15-18, 2014.

*Trends in Non-Linear Analysis*, IST Lisbon, Portugal, July 31 - August 1, 2014.

*Eighth European Conference on Elliptic and Parabolic Problems*, Gaeta (Italy), May 25–30, 2014.

*Calculus of Variations and Optimization*, a conference on the occasion of the 60th birthday of Giuseppe Buttazzo, Pisa, May 21-23, 2014.

*2014 SIAM UKIE Annual Meeting*, University College London (UK), January 9, 2014.

*Mathematics and Mechanics in the Physical Sciences: A Tribute to James Serrin*, Minneapolis, November 14-16, 2013.

*Calculus of Variations Day*, University of Évora, July 29, 2013.

*Mathematics and Mechanics in the search for New Materials*, in celebration of Richard James' 60th birthday, Banff International Research Station, July 14-19, 2013.

*Variational Views in Mechanics and Materials (V2M2)*, Pavia (Italy), June 24-26, 2013.

*Calculus of Variations and Differential Equations*, EPFL (Lausanne, Switzerland), June 10-12, 2013.

*Workshop on Industrial and Applied Mathematics*, Beijing (China), May 10, 2013.

*2013 Joint Mathematics Meetings*, San Diego, January 9-12, 2013.

*NCTS Workshop on Theoretical and Computational Challenges on PDEs*, National Center for Theoretical Sciences (NCTS), Hsinchu, Taiwan, R.O.C., December 13-15, 2012.

*2012 Annual Meeting of the Mathematical Society of the Republic of China*, National Chiao Tung University, Hsinchu, Plenary speaker. December 7 to 9, 2012.

*Variational Models and Methods for Evolution*, Levico (Trento, Italy), September 10-12, 2012.

*Geometric Partial Differential Equations*, Centro De Giorgi of Pisa (Pisa, Italy), September 10-14, 2012.

*Variational Problems with Multiple Scales*, Otranto (Italy), June 6-8, 2012.

*SIAM Conference on Imaging Science*, Philadelphia, May 20-22, 2012.

*Singularities in Physical Systems and the Calculus of Variations*, minisymposium held at the *SIAM Conference on Analysis of Partial Differential Equations*, San Diego, November 14-17, 2011.

*Variational Methods and Applications*, minisymposium held at the *SIAM Conference on Analysis of Partial Differential Equations*, San Diego, November 14-17, 2011.

*Mathematical Theory and Simulation of Phase Transitions*, Beijing (China), November 7-11, 2011.

*Annual Convention of the German Math Society*, Cologne (Germany). Plenary Speaker, September 19-22, 2011.

*Multiscale Phenomena in Calculus of Variations and Inverse Problems* minisymposium, ICIAM 2011, Vancouver (Canada), July 18-22, 2011.

*Theoretical and Numerical Aspects in Variational-PDE Methods for Solving Inverse Problems in Imaging Sciences*, minisymposium, ICIAM 2011, Vancouver (Canada), July 18-22, 2011.

*Mathematical Fluid Mechanics and Biomedical Applications*, Azores (Portugal), May 31-June 4, 2011.

*Mathematical Challenges for Sustainability*, Rutgers, November 15-17, 2010.

*Applied and Numerical Analysis*, a conference in honor of Michel Chipot's 60<sup>th</sup> birthday, Institute for Mathematics of the University of Zürich, September 30, 2010.

*A Conference on Highly Oscillatory Problems* sponsored by European Science Foundation, Isaac Newton Institute, Cambridge. Plenary Speaker, September 13-17, 2010.

*Second Workshop on Thin Structures*, Istituto Piccole Ancelle di Cristo Re, Naples, Italy, September 9-11, 2010.

*Istituto Nazionale di Alta Matematica (INdAM)*, Sicily, Italy, June 4, 2010.

*Vector-valued mappings and systems of PDE's*, Rome (INdAM, Istituto Nazionale di Alta Matematica), May 17-21, 2010.

NSF MPS Energy Workshop, March 15, 2010.

*SIAM Conference on Analysis of PDEs*, minisymposium on *Analysis of Phase-Field Models: From geometry and the materials sciences to image analysis and processing*, Miami, Florida, December 7-9, 2009.

*SIAM Conference on Analysis of PDEs*, minisymposium on *Variational Methods in Materials Science*, Miami, Florida, December 7-9, 2009.

*US-China-Workshop on Nanostructured Materials for Global Energy and Environmental Challenges*, Suzhou City, China, 2009.

*Session on Partial Differential Equations*, 3rd Latin American Congress of Mathematicians, Santiago (Chile), August 31-September 4, 2009.

*Workshop in Challenges and Advances in Computational Materials Simulations and Design*, Institute for Mathematical Sciences (IMS) at the National University of Singapore (NUS), July 20-24, 2009.

*Workshop on Asymptotic Analysis in the Calculus of Variations and PDEs*, PIMS Vancouver, UBC, July 6-10, 2009.

*Workshop on Applied Mathematics*, Basque Center for Applied Mathematics (BCAM) Bilbao (Spain), July 2-4, 2009.

*Workshop on Mathematical Aspects of Imaging, Modelling and Visualization in Multiscale Biology*, ICES (Institute for Computational, Engineering and Sciences), U. Texas (Austin), March 31-April 4, 2009.

*Workshop on Nonlinear Analysis, Mathematical Sciences Institute (MSI)*, The Australian National University, Canberra (Australia), March 18-19, 2009.

*South-West Analysis Meeting*, Bath, January 2009.

*Minisymposium on Using Mechanics to Discover Materials in honor of R. James*, 45th Annual Meeting of SES held at the University of Illinois at Urbana-Champaign, October 12-15, 2008.

*Calculus of Variations and its Applications: from Engineering to Economy*, Lisbon (Portugal), September 2008.

Annual SIAM Meeting, San Diego, July 7-11, 2008.

*Minisymposium on Microstructures, Micromechanics, and Structured Deformations*, 3rd Canadian Conference on Nonlinear Solid Mechanics, Toronto, June 25-29, 2008.

*SIAM Conference on Mathematical Aspects of Materials Science*, Philadelphia, May 11-14, 2008.

*Workshop on New Trends in Calculus of Variations and Mass Transport*, CNA, Carnegie Mellon University, March 13-15, 2008.

*Workshop on Variational Methods for Nonlinear PDE and their Applications*, Technion, Haifa, Israel, March 5-10, 2008.

*US-Chile Workshops: New Developments in Partial Differential Equations II*, Santiago, Chile, January 2008.

*SIAM Conference on Analysis of Partial Differential Equations (PD07)*, Minisymposium of on *Recent Trends in Calculus of Variations*, Kohn and Serfaty org., Mesa, Arizona, December 10-12, 2007.

*Mathematical Aspects of Materials Science*, minisymposium ICIAM Zurich, July 16-20, 2007.

*New Trends in Partial Differential Equations and Calculus of Variations*, Cortona, May 6-12, 2007.

*Mathematical Aspects of Continuum Physics: Analysis, Computation, and Modelling*, 2006 Winter Meeting of the Canadian Mathematical Society, Toronto, December 9-11, 2006.

*Special Session on Calculus of Variations 2005 Fall AMS Central Sectional Meeting*, University of Nebraska-Lincoln, October 12-13, 2006.

*Conference on Variational Problems and Materials Science*, Centro De Giorgi, Pisa, October 8-14, 2006.

*Hot Topics Workshop on Negative Index Materials*, IMA, October 2-4, 2006.

Plenary talk at the *Satellite Conference Calculus of Variations and PDE: challenges and applications*, associated with the ICM2006, August 16-19, 2006.

*CIM Workshop on Mathematics and Chemistry*, Lisbon, July 19-21, 2006.

*Classical and Advanced Theories of Thin Structures: Mechanical and Mathematical Aspects (course)*, Udine, Italy, June 5-9, 2006.

*Women in Mathematics: the legacy of Ladyzhenskaya and Oleinik*, MSRI, May 18-20, 2006.

*Fifth GAMM-Seminar on Microstructures*, University Duisburg-Essen, Germany, January 13-14, 2006.

*Workshop on Thin Structures*, Naples, September 15-17, 2005.

*Americas VI meeting on Non Linear Analysis and Differential Equations*, Santiago, Chile, January 17-21, 2005.

*Joint Mathematics Meeting*, AMS, Atlanta, January 5-8, 2005.

*SIAM Activities Group on Analysis of Partial Differential Equations*, Houston, December 6-8, 2004.

*Trends in the Calculus of Variations*, U. Parma, September 15 - 18, 2004.

*Conference in Honor of J. P. Carvalho Dias 60th Birthday*, Lisbon, September 8, 9, 2004.

*Variational Problems in Materials Science*, SISSA, September 6-9, 2004.  
*CNA Conference in Honor of Mort Gurtin's 70th Birthday*, Pittsburgh, June 26-28, 2004.  
*Calculus of Variations*, Oberwolfach, June 13-19, 2004.  
*Differential Equations and Control Theory*, AMS Meeting at Ohio University, March 26-27, 2004.  
*Third GAMM-Seminar on Microstructures*, U. Stuttgart, Germany, January 8-10, 2004.  
*New Challenges in Applied Mathematics*, Castro-Urdiales, September 1-5, 2003.  
*Multiple Scale Systems-Modeling, Analysis and Numerics*, Oberwolfach, July 27-August 2, 2003.  
*Calculus of Variations and Optimization*, Luminy, June 2003.  
*Non-Linear PDEs: Theory and Applications*, Madeira, June 27-29, 2003.  
*US/EU Meeting on Phase Transitions in Crystals and TMR Annual Meeting*, University of Minnesota, April 10-12, 2003.  
*Workshop on Partial Differential Equations, Inverse Problems and Non-Linear Analysis*, Centro de Modelamiento Matemático (CMM), Facultad de Ciencias Físicas y Matemáticas, Universidad de Chile, January 13-19, 2003.  
*Calculus of Variation*, Oberwolfach, June 30 - July 6, 2002.  
*AMS-UMI Meeting*, Pisa, June 12-16, 2002.  
*Mathematical Methods for Materials Science*, Bressanone, Italy, December 13-15, 2001.  
*The Mathematics of Ennio De Giorgi*, Pisa, October 24-27, 2001.  
*Midwest PDE Seminar*, Madison, September 29-30, 2001.  
*Variational Methods for Discontinuous Structures*, Como, July 4-6, 2001.  
*Phase Transitions*, Oberwolfach, April 30 - May 5, 2001.  
*Society for Natural Philosophy*, Berkeley, September 28-October 1, 2000.  
*Multiscale Problems in Science and Technology. Challenges to Mathematical Analysis and Perspectives*, Dubrovnik, 3-9 September 2000.  
*Third European Congress of Mathematics*, Barcelona, July 2000.  
*Calculus of Variations*, Oberwolfach, July 2-8, 2000.  
*Year 2000 International Conference on Dynamical Systems and Differential Equations*, Kennesaw State University, May 18-21, 2000.  
*Northwestern Centennial PDE Conference*, Northwestern University, March 11, 2000.  
*Phase Transitions and Interfaces in Evolution Equations: Analysis, Control, and Approximation*, Santa Margherita Ligure, Italy, February 8-12, 2000.  
*Mathematics and its Role in Civilization*, Macau, China, January 2000.  
*Nonlinear Partial Differential Equations and Applications*, Lisbon, Portugal, October 1999.  
*Differential Equations and Calculus of Variations*, Isola d'Elba, Italy, October 25-29, 1999.  
*ICIAM 99, the Fourth International Conference on Industrial and Applied Mathematics*, Edinburgh, Scotland, July 1999.  
*Shape Optimization and Related Topics*, CIRM Luminy (Marseille), June, 21-25, 1999.  
*Fourth Mississippi State Conference in Differential Equations and Computational Simulations*, May 21-22, 1999.  
*Seventh International Symposium on Plasticity*, Cancun, January 5-1, 1999.  
*MRS Fall Meeting, Interaction of Phase and Defect Microstructures in Metallic Alloys*, Boston (MA, USA), November 30-December 4, 1998.  
*AMS Meeting*, State College (PA, USA). Invited Address, October 24-25, 1998.  
*Society for Natural Philosophy*, Carnegie Mellon University, October 10-12, 1998.

*SIAM Annual Meeting*, University of Toronto (Canada). Invited Address, July 13-17, 1998.  
*Calculus of Variations*, Oberwolfach (Germany), July 5-11, 1998.  
*Journées Michel Artola*, Bordeaux (France), November 6-7, 1997.  
*AMS Meeting*, Atlanta (Georgia), Invited Address, October 10-12, 1997.  
*Second Euroconference and International Symposium on Material Instabilities*, Aristotle University of Thessaloniki (Greece), August 31- September 5, 1997.  
*Mathematical Continuum Mechanics*, Oberwolfach (Germany), June 22-28, 1997.  
*The Mumford-Shah Conjecture and Related Problems*, Cortona (Italy), May 26-30, 1997.  
*International Conference on Applied Analysis*, Lisbon (Portugal), February 26 - March 1, 1997.  
*Calculus of Variations*, Oberwolfach (Germany), July 7-13, 1996.  
*Nonconvex Optimization Évora/96*, University of Évora (Portugal), June 23-27, 1996.  
*AMS Meeting*, Courant Institute, New York, April 13-14, 1996.  
*AMS-TMS Materials International Congress*, Cleveland, Ohio, October 30- November 2, 1995.  
*Phase Transitions, Composite Materials and Microstructure*, IMA; Minneapolis, Minnesota, September 18-22, 1995.  
*ICIAM*, Hamburg, July 3-7, 1995.  
*Calculus of Variations and Nonlinear Elasticity*, Cortona (Italy), June 12-16, 1995.  
*Eurhomogenization*, Nice (France), June 6-10, 1995.  
*Mathematical Models in Phase Transitions*, Oberwolfach (Germany), May 14-20, 1995.  
*Variational Methods for Discontinuous Structures*, Como (Italy), September 8-10, 1994.  
*Symposium on Trends in Applications of Mathematics to Mechanics*, Lisbon (Portugal), July 23-30, 1994.  
*Motion by Mean Curvature and Related Topics*, Trento (Italy), June 27-July 2, 1994.  
*European Conference on Elliptic and Parabolic Problems*, Pont-à-Moussons (France), June 13-17, 1994.  
*SIAM Conference on Emerging Issues in Mathematics and Computation from the Materials Sciences*, Pittsburgh, April 18-20, 1994.  
*Three Rivers Applied Colloquium*, Carnegie Mellon University, Pittsburgh, April 9-10, 1994.  
*Arkansas Spring Lectures in Mathematical Sciences*, University of Arkansas, March 31-April 2, 1994.  
*Smart Structures and Materials SPIE conference*, Orlando, Florida, 13-18 February, 1994.  
*Calculus of Variations, Homogenization and Continuum Mechanics*, CIRM Marseille-Luminy (France), June 21-25, 1993.  
*Metz Days on Homogenization and Oscillations*, Metz,(France), June 7-8, 1993.  
*Calculus of Variations and Nonlinear Elasticity*, Cortona (Italy), May 24-28, 1993.  
*The Winter Annual Meeting of the American Society of Mechanical Engineers*, Anaheim, California, November 8-13, 1992.  
*Surface tension and movement by mean curvature*, Trento (Italy), July 20-24, 1992.  
*Continuum models for the microstructure of crystals*, Heriot-Watt University, Edinburgh (G.B), June 8-13, 1992.  
*Thirty fifth Meeting of the Society for Natural Philosophy, Partial Differential Equations and Mechanics*, Southern Illinois University at Carbondale, November 1, 2, 3, 1991.  
*868th AMS Meeting, special session on Phase Transitions and/or Front Propagation*, Temple University, Philadelphia, PA, October 12-13, 1991.  
*Singuläre Störungsrechnung*, Oberwolfach (Germany), June 9-15, 1991.

*Thermomechanics of Materials*, Padova (Italy), June 4-7, 1991.x  
*Calculus of Variations and Nonlinear Elasticity*, Cortona (Italy), May 27-31, 1991.  
*Microstructure and Phase transitions*, IMA, November 12-16, 1990.  
*Calculus of Variations and Nonlinear Material Behavior*, Carnegie Mellon University, November 1-4, 1990.  
*PDE Concentration Period*, MSRI, Berkeley, Oct 1-10, 1990.  
*Calculus of Variations, Elasticity and Crystals*, Trento (Italy), December 11-15, 1989.  
NSF-CBMS Conference on *Weak Convergence methods in nonlinear PDEs*, Loyola University of Chicago, June 27-July 1, 1988.  
*The mathematical Analysis of Material Microstructure*, Cornell University, June 15-18, 1988.  
*International Conference on Nonlinear elliptic and parabolic problems*, University of Nancy I (France), March 14-18, 1988.  
*First International Conference on Industrial and Applied Mathematics*, Cité des Sciences et de l'Industrie, Paris, 29-July 3, 1987.  
*Non-Classical Continuum Mechanics: Abstract Techniques and Applications*, Durham (G.B), July 2-12, 1986.  
*Elasticity Theory*, Mathematisches Forschungsinstitut, Oberwolfach (R.F.A), April 14-19, 1986.  
*Material Instabilities and Partial Differential Equations*, Heriot-Watt University, Edinburgh (G.B), March 24-25, 1986.

---

## ORGANIZING COMMITTEES OF CONFERENCES AND SYMPOSIA:

Global Portuguese Mathematicians, University of Porto, Portugal, June 26-28, 2019

Scientific Program Committee, Ninth International Congress of Industrial and Applied Mathematics (ICIAM 2019), Valencia, Spain.

Organizing Committee, Multiscale Modeling Theory and Computation, An International Conference Honoring Professor Mitchell Luskin on the Occasion of his 65th Birthday, University of Minnesota, Minneapolis, September 23-25, 2017.

Program Committee of the 2nd Mathematical Congress of the Americas, MCA 2017, Montréal, Canada, July 23-27, 2017.

A Conference on Applied Analysis on the Occasion of the 75th Birthday of David Kinderlehrer, CNA (CMU), June 18-20, 2016.

PIRE-CNA Summer School on New Frontiers in Nonlinear Analysis for Materials, CNA (CMU), June 2-10, 2016.

*International Workshop on Calculus of Variations and its Applications, on the Occasion of Luisa Mascarenhas' 65<sup>th</sup> Birthday*, Lisbon, Portugal, December 17-19, 2015.

*Mathematics and Mechanics in the 22nd Century: Seven Decades and Counting...*, conference in honor of Jerry Ericksen's 90th Birthday, Eugene, Oregon, October 23-25, 2015.

PIRE-MPI Workshop on From Grain Boundaries to Stochastic Homogenization, MPI, Leipzig, Germany, July 20-13, 2015.

Scientific Committee of the X-Americas Conference on Nonlinear Analysis and Differential Equations, Buenos Aires, Argentina, January 12-16, 2015.

Scientific Committee of the 2013 conference of the Real Sociedad Matemática Española, CEDYA-2013, Castellón, Spain, September 9-13, 2013.

2013 CNA Summer School, (CMU), Topics in Nonlinear PDEs and Calculus of Variations, and Applications in Materials Science, May 30-June 7, 2013.

ComplIMAGE 2012 Conference-Computational Modeling of Objects Presented in Images: Fundamentals, Methods and Applications, Rome (Italy), September 5-7, 2012.

ICIAM 2011 minisymposia on Modern Methods and Applications of the Calculus of Variations, with Rustum Choksi, Vancouver, July 18-22, 2011.

Scientific Committee of the IV Congreso Latinoamericano de Matematicos (IV CLAM), Cordoba, Argentina, August 6-10, 2012.

2010 SIAM Annual Meeting (AN10), minisymposium on Calculus of Variation, Pittsburgh, July 12-16, 2010.

Organizing Committee of the 2010 CNA Summer School on New Vistas in Image Processing and PDEs, June 7-12, 2010.

SIAM Meeting on Mathematical Aspects of Materials Science, minisymposium on *Variational Methods in Materials Science*, Philadelphia, May 23-26, 2010.

Steering Committee of the NSF MPS Energy Workshop, NSF, March 14-15, 2010.

SIAM Conference on Analysis of Partial Differential Equations 09, minisymposium on *Variational Methods and Nonlinear PDE in Image Processing*, Miami, Florida, December 7-9, 2009.

Organizing Committee of 2008 CNA Summer School on Contemporary Topics in Nonlinear PDEs, (<http://www.math.cmu.edu/cna/Summer08>), May 29-June 7, 2008.

Selection committee for The John von Neumann Lecture (SIAM)

Organizing Committee of the 2008 SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, May 11-14, 2008.

2008 SIAM Conference on Mathematical Aspects of Materials Science, co-organizer of the Minisymposium on *Variational Models for Advanced Materials*, Philadelphia

Organizing committee of the US-Chile workshops (Pittsburgh 2007 and Chile 2008 (<http://www.math.cmu.edu/cna/cmuchile>)).

SIAM Conference on Analysis of Partial Differential Equations (PD07), co-organizer of the Minisymposium on *Energy Based Approaches to Nonlinear PDEs*, Mesa (Az), December 10-12, 2007.

Organizing committee of the Conference in Honor of David Kinderlehrer's 65th Birthday, CNA, October 19-21, 2006.

Organizing Committee of 2006 CNA Summer School on Probabilistic and Analytical Perspectives on Contemporary PDEs, (<http://www.math.cmu.edu/cna/Summer06/index>), May 29-June 6, 2006.

Organizing committee of the Workshop on the Calculus of Variations in 2005, CNA, (<http://www.math.cmu.edu/cna/cal/html/index.html>), October 17-19, 2005.

Organizing Committee of the conference Frontiers of Applied Analysis, CNA, (<http://www.math.cmu.edu/cna/frontiers/index.html>), September 8-10, 2005.

Member of the ICIAM Lagrange Prize Subcommittee, to be awarded at the ICIAM Congress in Zurich, 2007.

Subcommittee for the Lagrange Prize, ICIAM Congress in Zurich, 2007.

Second SIAM Activity Group Conference on Analysis of Partial Differential Equations (APDE06), Boston, Co-Chair, July 9-12, 2006.

International Congress of Applied Mathematics, Center for Mathematical Modelling (CMM), Universidad de Chile, in Santiago de Chile, Steering Committee, 13-17 March, 2006.

Organizing Committee of the 2004 SIAM Conference on Mathematical Aspects of Materials Science, 2004.

Co-Organizer (with P. Marcellini) of a Session of the International AMS-UMI Conference, Pisa (Italy), on Contemporary Developments in Partial Differential Equations and in the Calculus of Variations, June 12-16, 2002.



Organizing Committee of 2001 CNA Summer School-Multiscale Problems in Nonlinear Analysis (CMU), (<http://www.math.cmu.edu/cna/summerschool.html>), 2001.

Organizing Committee of Conference in Honor of James Greenberg 60th Birthday (CMU), (<http://www.math.cmu.edu/cna>), 2001.

Organizing Committee of Mathematical Issues in the Sciences: an Exploratory Workshop (CMU), (<http://www.math.cmu.edu/cna>), 2000.

Organizing Committee of the STAMM 2000-Symposium on Trends in Applications of Mathematics to Mechanics (Lisbon, Portugal), 2000.

Organizing Committee of the NEE/Macau '98 - Nonlinear Evolution Equations and Applications (Macau), 1998.

Organizing Committee of the Special Session on "Recent Developments in Partial Differential Equations, Calculus of Variations, and Applications to Problems in Materials Science" for the AMS meeting in Atlanta, Georgia, October 10-12 1997.

Organizing Committee of the SIAM Meeting on Mathematical/Computational Aspects of Materials Science (Philadelphia), May 1997.