

# Curriculum Vitae

MARIAN BOCEA

## Contact information

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## Education

Ph.D. in Mathematical Sciences, Carnegie Mellon University, *May 2004*

Ph.D. Advisor: Irene Fonseca

Ph.D. Thesis Title: *A Young Measure Approach to Nonlinear Membrane Theory*

M.Sc. in Mathematical Sciences, Carnegie Mellon University, *December 2000*

Ph.D. in Mathematics, University of Craiova, Romania, *July 2000*

Ph.D. Advisor: Constantin P. Niculescu

Ph.D. Thesis Title: *Contributions to the Mathematical Theory of Hemivariational Inequalities and Applications to Mechanics*

M.Sc. in Applied Mathematics, University of Craiova, Romania, *June 1997*

M.Sc. Dissertation Advisors: Panagiotis D. Panagiotopoulos, Aristotle University of Thessaloniki, Greece and Vicențiu Rădulescu, University of Craiova, Romania

M.Sc. Dissertation Title: *Eigenvalue Problems in Hemivariational Inequalities*

B.Sc. in Mathematics, University of Craiova, Romania, *June 1996*

B.Sc. Thesis Advisor: Vicențiu Rădulescu

B.Sc. Thesis Title: *Elliptic Problems with  $L^1$  Data*

## Experience

Assistant Professor, Department of Mathematics, North Dakota State University (since August 2006)

Burgess Assistant Professor, Department of Mathematics, University of Utah (July 2004-July 2006)

Graduate Teaching and Research Assistant, Department of Mathematical Sciences, Carnegie Mellon University (August 1999-June 2004)

Research Assistant, Department of Mathematics, University of Craiova, Romania (October 1996-July 1999)

## Research Interests

*Analysis of Partial Differential Equations, Calculus of Variations, Geometric Measure Theory.*

*Applications to Materials Science:* material instabilities, fracture and defects in solids, dielectric breakdown, polycrystal plasticity, the formation of microstructure in crystalline solids, thin films of martensitic materials, shape memory alloys, ferroelectric and magnetic materials, phase transitions, homogenization and optimal design of composite materials.

## Publications

15. M. Bocea, A justification of the theory of martensitic thin films in the absence of an interfacial energy. *Journal of Mathematical Analysis and Applications* **342** No. 1 (2008), 485-496.
14. M. Bocea and V. Nesi,  $\Gamma$ -convergence of power-law functionals, variational principles in  $L^\infty$ , and applications. *SIAM Journal on Mathematical Analysis* **39** No. 5 (2008), 1550-1576.
13. M. Bocea, Young measure minimizers in the asymptotic analysis of thin films. *Electronic Journal of Differential Equations* **15** (2007), 41-50.
12. M. Bocea and I. Fonseca, A Young measure approach to a nonlinear membrane model involving the bending moment. *Royal Society of Edinburgh Proceedings A* **134** No. 5 (2004), 845-883.
11. P.D. Panagiotopoulos, M. Bocea and V. Rădulescu, Inequality problems with non locally Lipschitz energy functional: existence results and applications to nonsmooth mechanics. *Applicable Analysis* **82** No. 6 (Panagiotopoulos special issue) (2003), 561-574.
10. M. Bocea and I. Fonseca, Equi-integrability results for 3D-2D dimension reduction problems. *ESAIM: Control, Optimization and Calculus of Variations* **7** (2002), 443-470.
9. M. Bocea, D. Motreanu and P.D. Panagiotopoulos, Multiple solutions for a double eigenvalue hemivariational inequality on a spherelike manifold. *Nonlinear Analysis, T.M.A.* **42** No. 5 (2000), 737-749.
8. M. Bocea, P.D. Panagiotopoulos and V. Rădulescu, Double eigenvalue hemivariational inequalities with non-locally Lipschitz energy functionals. *Communications in Applied Nonlinear Analysis* **6** No. 4 (1999), 17-29.
7. M. Bocea, Existence of solutions for hemivariational inequalities with non-Lipschitz energy functionals. *Romanian Journal of Pure and Applied Mathematics* **44** No. 3 (1999), 315-325.
6. M. Bocea, P.D. Panagiotopoulos and V. Rădulescu, A perturbation result for a double eigenvalue hemivariational inequality with constraints and applications. *Journal of Global Optimization* **14** No. 2 (1999), 137-156.
5. M. Bocea and V. Rădulescu, An eigenvalue Dirichlet problem with weight and  $L^1$  data. *Mathematische Nachrichten* **198** (1999), 5-17.
4. M. Bocea and V. Rădulescu, Multivalued problems with strong resonance at infinity and  $L^1$  data. *Romanian Journal of Pure and Applied Mathematics* **43** No. 5-6 (1998), 533-540.
3. M. Bocea, Multiple solutions for a class of eigenvalue problems involving a monotone operator in hemivariational inequalities. *Applicable Analysis* **65** No. 3-4 (1997), 395-407.
2. M. Bocea and V. Rădulescu, Problèmes elliptiques avec non-linéarité discontinue et second membre  $L^1$ . *Comptes Rendus de l'Académie des Sciences Paris - Série I - Mathématique* **324** No. 2 (1997), 169-172.

1. M. Bocea, Sur quelques problèmes d'analyse fonctionnelle. *Annals of the University of Craiova* **21** (1995), 51-58.

### Selected Colloquia, Conference and Seminar Talks

- SIAM Session on *Elasticity*, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, May 2008
- 2008 Joint Mathematics Meetings (AMS Session on *Analysis and Ordinary Differential Equations*), San Diego, CA, January 2008
- Minisymposium on *Multiscale Phenomena in Material Sciences*, SIAM Conference on Analysis of Partial Differential Equations, Mesa, AZ, December 2007
- Minisymposium on *Energy Based Approaches to Nonlinear PDEs*, SIAM Conference on Analysis of Partial Differential Equations, Mesa, AZ, December 2007
- Workshop on *Modeling, Analysis and Simulation of Multiscale Nonlinear Systems*, Oregon State University, Corvallis, OR, June 2007
- Tri-College Colloquium, Concordia College, April 2007
- Colloquium, Department of Mathematics, Worcester Polytechnic Institute, December 2006
- *A Conference on Applied Analysis on the Occasion of the 65th Birthday of David Kinderlehrer*, Carnegie Mellon University, Pittsburgh, PA, October 2006
- 2006 Fall Western Section Meeting (Special Session on *Nonconvex Variational Problems: Recent Advances and Applications*), Salt Lake City, UT, October 2006
- SIAM Conference on Analysis of Partial Differential Equations (Minisymposium on *Microstructures and PDE: New Challenges and New Methods*), Boston, MA July 2006
- Joint Mathematics Meetings, San Antonio, TX, January 2006
- Undergraduate Colloquium, Department of Mathematics, University of Utah, November 2005
- 56th Midwest PDE Seminar, University of Notre Dame, December 2005
- Conference on Partial Differential Equations and Applications, University of Florida, November 2005
- AMS Fall 2005 Central Section Meeting (Special Session on *Calculus of Variations*), Lincoln, NE, October 2005
- Graduate Colloquium, Department of Mathematics, University of Utah, October 2005
- *Frontiers of Applied Analysis - A Conference on the Occasion of the 15th Anniversary of the Center for Nonlinear Analysis*, Carnegie Mellon University, September 2005
- IMA Workshop: *Effective Theories for Materials and Macromolecules*, Minneapolis, MN, June 2005
- VIGRE Mini-course on *Nonconvex Variational Problems and Applications*, University of Utah, May 2005
- Sixth MSU-UAB Conference on *Differential Equations and Computational Simulations - A conference dedicated to Louis Nirenberg and Klaus Schmitt for their contributions to Mathematics*, Mississippi State University, May 2005
- Colloquium, Department of Mathematics, University of Utah, February 2005
- Joint Mathematics Meetings, Atlanta, GA, January 2005
- Undergraduate Colloquium, Department of Mathematics, University of Utah, November 2004
- Applied Mathematics Seminar, University of Utah, September 2004
- SIAM Conference on *Mathematical Aspects of Materials Science*, Los Angeles, CA, May 2004
- Colloquium, Department of Mathematics, University of Central Florida, February 2004
- Colloquium, Department of Mathematics, Lehigh University, February 2004
- Joint Mathematics Meetings (AMS Special Session on *Nonlinear PDEs and Variational Problems*), Phoenix, AZ, January 2004

- Symposium on *Analysis and PDEs*, Purdue University, May 2003
- Partial Differential Equations Seminar, Carnegie Mellon University, April 2003
- Pan American Advanced Studies Institute, Santiago, Chile, January 2003
- SIAM 50th Anniversary and 2002 Annual Meeting, Philadelphia, July 2002
- Mathematical Sciences Graduate Student Workshop, Carnegie Mellon University, May 2002
- *Nonlinear Differential Equations, Mechanics and Bifurcation* - A conference in honor of David G. Schaeffer, Duke University, May 2002
- Partial Differential Equations Seminar, Carnegie Mellon University, March 2002
- *Progress in Partial Differential Equations*, Royal Society of Edinburgh, U.K., July 2001
- Partial Differential Equations & Kinetic Theory Seminar, Carnegie Mellon University, February 2001
- *Mathematical Challenges of the 21st Century*, University of California at Los Angeles, August 2000
- Colloquium, Department of Applied Mathematics, Universidad Complutense de Madrid, Spain, April 1999

### Awards, Fellowships, Grants

- 2008 SIAM Early Career Travel Award, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, PA, May 2008
- Professional Development Grant, Office of the President, North Dakota State University, 2007-2008
- DOE-NSF Travel Grant, Workshop on *Modeling, Analysis and Simulation of Multiscale Nonlinear Systems*, Oregon State University, Corvallis, OR, June 2007
- Professional Development Grant, Office of the President, North Dakota State University, 2006-2007
- 2005-2006 Outstanding Instructor Award, Department of Mathematics, University of Utah
- Burgess Award, University of Utah, 2004-2007
- Research Fellowship, Department of Mathematical Sciences, Carnegie Mellon University, 2003-2004
- GSA Conference Travel Grant, Carnegie Mellon University, 2002, 2004
- 2002 SIAM Student Travel Award
- E.U. Grant, (through Royal Society of Edinburgh), *Progress in Partial Differential Equations*, Edinburgh, U.K., July 2001
- E.U. Grant, Instructional Conference in *Nonlinear Partial Differential Equations*, Edinburgh, U.K., January 2001
- E.U. Grant, *Selected Issues in the Mechanics of Crystalline Solids*, Padova, Italy, October 2000
- NSF Travel Grant (through American Mathematical Society), *Mathematical Challenges of the 21st Century*, Los Angeles (U.C.L.A.), August 2000
- E.U. Grant, *New Mathematical Methods in Continuum Mechanics*, Crete, July 2000
- World Bank Fellowship, Universidad Complutense, Madrid, Spain, March 1999-May 1999
- TEMPUS Fellowship (E.U. Programme S-JEP 09094-95), Aristotle University of Thessaloniki, Greece, March 1997-June 1997
- Ministry of National Education Doctoral Fellowship (Romania), October 1996-July 1999
- National Council of Scientific Research (Romania) Grants, 1997-1999, Co-PI, Principal Investigator: Constantin P. Niculescu
- Merit Undergraduate Scholarship, University of Craiova, Romania, 1991-1996

### Teaching Experience

- MATH 785 Partial Differential Equations II - Spring 2008, North Dakota State University
- MATH 266 Introduction to Differential Equations - Spring 2008, North Dakota State University
- MATH 784 Partial Differential Equations I - Fall 2007, North Dakota State University
- MATH 790 Applied Mathematics Seminar (Organizer) - Spring 2008, Fall 2007, North Dakota State University

## University

- MATH 489-689 Numerical Analysis II - Spring 2007, North Dakota State University
- MATH 491 Capstone Seminar (Coordinator) - Spring 2007, Fall 2007, North Dakota State University
- MATH 488-688 Numerical Analysis I - Fall 2006, North Dakota State University
- MATH 265 Calculus III - Fall 2006, Spring 2007, Fall 2007, North Dakota State University
- 3210 Foundations of Analysis I - Summer 2006, University of Utah
- 7825 Analysis Seminar - Spring 2006, University of Utah
- 7280 Operator Theory - Spring 2006, University of Utah
- 1010 Intermediate Algebra - Spring 2006, University of Utah
- 6880 Homogenization & Optimal Design - Fall 2005, University of Utah
- 7845 Differential Equations Seminar - Fall 2005, University of Utah
- 3220 Foundations of Analysis II - Summer 2005, University of Utah
- 3210 Foundations of Analysis I - Spring 2005, University of Utah
- 2280 Introduction to Differential Equations - Fall 2004, University of Utah
- 21-111 Calculus for Humanities - Summer 2004, Carnegie Mellon University
- 21-127 Concepts of Mathematics - Spring 2000-Summer 2003, Carnegie Mellon University
- 21-259 Calculus in Three Dimensions - Spring 2002, Summer 2002, Carnegie Mellon University
- 21-115 Differential Calculus - Summer 2001, Carnegie Mellon University
- 21-116 Integral Calculus - Summer 2001, Carnegie Mellon University
- 21-260 Differential Equations - Fall 1999, Summer 2000, Carnegie Mellon University

**Service to the Profession**

- Chair of the AMS Session on *Analysis and Ordinary Differential Equations*, 2008 Joint Mathematics Meetings, San Diego, CA, January 2008
- Member of the American Mathematical Society's Committee on Meetings and Conferences Focus Group, San Diego, CA, January 2008
- Chair of the SIAM Session on *Nonlinear Waves and Turbulence*, SIAM Conference on Analysis of Partial Differential Equations, Mesa, AZ, December 2007
- Co-organizer (with Cristina Popovici, NDSU) of the AMS Special Session on *Calculus of Variations and Nonlinear PDE: Theory and Applications*, 2007 Joint Mathematics Meetings, New Orleans, LA, January 2007
- Co-organizer (with Andrej Cherkaev, University of Utah) of the AMS Special Session on *Nonconvex Variational Problems: Recent Advances and Applications*, 2006 Fall Western Section Meeting, Salt Lake City, UT, October 2006
- Reviewer for *Mathematical Reviews* (since 2005)
- Referee for:

Archive for Rational Mechanics and Analysis  
 Boundary Value Problems  
 International Journal of Mathematics and Mathematical Sciences  
 Journal of Global Optimization  
 Journal of Mathematical Analysis and Applications  
 SIAM Journal on Applied Mathematics

**Professional Affiliations**

- American Mathematical Society
- Society for Industrial and Applied Mathematics