Curriculum vitae of Giovanni Leoni
(February, 2021)
Personal data

- born in Sassuolo (Modena), Italy on March 10, 1967;

Education

- March 31, 1995, *Ph.D. in Mathematics,* University of Minnesota, Minneapolis, U.S.A., advisor: James Serrin;
- June 30, 1993, *Master in Mathematical Sciences*, University of Minnesota, Minneapolis, U.S.A., advisor: James Serrin;
- June 27 1990 *laurea in Mathematics*, Magna Cum Laude, University of Modena, Modena, Italy, advisor: Patrizia Pucci;

Academic positions

- July 1, 2005-present Full Professor, Department of Mathematical Sciences, Carnegie Mellon University, Pittsburgh;
- January 1, 2011-June 2017 Associate Director of the Center for Nonlinear Analysis, Carnegie Mellon University, Pittsburgh.
- September 1, 2002–June 30, 2005 Associate Professor with Tenure, Department of Mathematical Sciences, Carnegie Mellon University, Pittsburgh;
- January 2002 won a competition for full-professor in Analysis;
- November 1, 1998–August 31, 2002 Associate Professor, Department of Advanced Sciences and Technologies, University of Piemonte Orientale, Alessandria, Italy;
- January 1997- April 1997 post–doctoral associate, Center for Nonlinear Analysis, Carnegie Mellon University;
- July1,1995–October 31, 1998 Assistant Professor, Department of Mathematics, University of Perugia, Perugia, Italy;

Honors and awards

- *scholarship for undergraduate students,* National Council of Research, 1990;
- *scholarship to study abroad,* National Institute of High Mathematics F. Severi, 1990 (renewed for three years);
- *scholarship to study abroad,* National Council of Research, 1995;
- *selected communication for young mathematicians under 33* at the XVI meeting of the Italian Mathematical Society, Naples, 9-13/9-18–1999;
- award *Premio Giuseppe Bartolozzi* of the Italian Mathematical Society for best Italian mathematician under 34, 2001;
- award *Julius Ashkin Teaching Award* of the Mellon College of Sciences for unusual devotion and effectiveness in teaching undergraduate students, Carnegie Mellon University, 2013;
- award *Richard Moore Award* of the Mellon College of Sciences for substantial and sustained contributions to the educational mission of the college, Carnegie Mellon University, 2019.

Grants

- NSF "Singularly Perturbed and Multiscale Problems" 2004-2007;
- NSF "U.S.-Chile Workshop: PDEs-Preparatory Workshops; Pittsburgh, Pennsylvania; March 2006; Santiago, Chile; January 2007," PI's Irene Fonseca, David Kinderlehrer, Giovanni Leoni.

- NSF "Center for Nonlinear Analysis: Research and Training in Applied Mathematics" PI's Irene Fonseca, Co-PIs: Giovanni Leoni, Robert Pego, Noel Walkington, David Kinderlehrer; 2007-2012.
- NSF "Modern methods in the Calculus of Variations with applications to materials science and hydrodynamics" 2007-2011.
- FCT "Fine structures, homogenization, and multi-phase transitions", CMU-Portugal, 2011-2013, Co-PI.
- NSF "Modern methods in the Calculus of Variations with applications to materials science, mechanics, and imaging" 2010-2014.
- NSF "PIRE: Science at the Triple Point Between Mathematics, Mechanics and Materials Science", Associate Director; 2011-2016.
- NSF "Contemporary methods in calculus of variations and differential equations with applications to materials science" 2014-2017.
- NSF "Variational Methods for Materials Science and Mechanics" 2017-2021.
- NSF "Mathematics of Microstructure in Origami, Robotics, and Electrochemistry" 2021-2024.

Teaching activity

Carnegie Mellon University, Department of Mathematical Sciences

- Graduate Courses:
  - *Advanced Real Analysis,* Spring 2017, Spring 2019, Spring 2022
  - *Advanced topics in Analysis: Singular Integrals,* Spring 2004, Spring 2015
  - *Advanced topics in Analysis: Convex Analysis,* Spring 2008,
  - *Calculus of Variations,* Fall 2015, Fall 2019
  - *Complex Analysis*, Spring 2020
  - *General Topology,* Fall 2009
  - *Introduction to Functional Analysis,* Spring 2003, Spring 2006, Spring 2010, Spring 2021
  - *Measure and Integration,* Spring 2004, Fall 2007, Fall 2008, Fall 2010, Fall 2011, Fall 2016, Fall 2017
  - *Partial Differential Equations I*, Fall 2002, Fall 2013, Fall 2017
  - *Partial Differential Equations II,* Spring 2003, Spring 2014
  - *Sobolev Spaces,* Fall 2006, Fall 2008, Fall 2010, Fall 2012, Fall 2014
- Undergraduate Courses:
  - *Mathematical studies I (Honors),* Fall 2003
  - *Mathematical studies II (Honors),* Spring 2004, Spring 2021
  - *Mathematical studies I: Analysis (Honors),* Fall 2015, Fall 2018, Fall 2020
  - *Mathematical studies II: Analysis (Honors),* Spring 2012, Spring 2016, Spring 2017, Spring 2019, Spring 2021
  - *Multidimensional Calculus*, Fall 2021
  - *Principles of Real Analysis I,* Spring 2005, Spring 2007, Fall 2007, Spring 2010, Fall 2011, Fall 2012
  - *Principles of Real Analysis II,* Spring 2006, Spring 2011
  - *Sequences and series of functions,* Fall 2004, Fall 2005, Fall 2006
  - *Vector Analysis,* Spring 2013, Spring 2015, Spring 2020, Spring 2022
- Spring 2009, 2018 sabbatical.

University of Piemonte Orientale; Department of Advanced Sciences and Technologies

- Undergraduate Courses:
  - *Analisi Matematica II,* 1998-99, 1999-2000, 2000-2001, 2001-2002
  - *Calcolo II and III,* 2001-2002
  - *Istituzioni di Analisi Superiore,* 1999-2000

Politecnico of Torino

- Undergraduate Courses:
  - *Istituzioni di Matematica II,* 2000-2001

University of Perugia; Department of Mathematics

- Undergraduate Courses:
  - *Analisi Matematica I,* 1995-96
  - *Analisi Matematica II,* 1996-97, 1997-98

University of Minnesota; School of Mathematics

- Undergraduate Courses (teaching assistant):
  - *College Algebra and Probability* fall 1994
  - *Differential equations with linear algebra,* winter 95
  - *Multivariable calculus,* spring 95.

Undergraduate Research

- Calcagno Cinzia, thesis title *Sul metodo dei piani paralleli di Alexandrov-Serrin,* University of Piemonte Orientale, Italy, Fall 2001;
- Michela Magrin, thesis title *Unicitá delle soluzioni positive dell'equazione* $\Delta u + f(u) = 0$ *in* $\mathbb{R}^n$, University of Piemonte Orientale, Italy, Summer 2002;
- Eric Baer, honors thesis, *Some properties of fractional Sobolev spaces*, May 2006;
- Tarek Elgindi, undergraduate research, summer 2008;
- Timothy Li, undergraduate research, summer 2017; Currently: Industry;
- Michael Spoerl, honors thesis, 2018; Currently: Ph.D. Michigan University;
- Laurie Jin (co-advised with W. Hrusa), honors thesis, 2018. Currently: Industry;
- Taisuke Yasuda, undergraduate research, spring 2019;
- Scott Harvey-Arnold, honors thesis, 2020; Currently: Industry;
- Andrew Chen, honors thesis, 2020; Currently Ph.D. Cornell University;
- Thomas Lam, undergraduate research, summer 2021;
- Vlad, Oleksenko, undergraduate research, summers 2021 and 2022;
- Khunpob Sereesuchart; undergraduate research, summers 2021 and 2022;
- Grant Yu; undergraduate research, summer 2021;
- Justin Sun; undergraduate research, Spring 2022;
- Braden Yates, undergraduate research, Summer 2022;
- Jiewen Hu, undergraduate research, Summer 2022.
- Kevin You, undergraduate research, Summer 2022.

Thesis students

- Graca Carita (co-advisor with Irene Fonseca), Ph.D., thesis title *Relaxation in SBV for Constrained-Valued Fields,* June 2007 (deceased)
- Danut Arama, Ph.D., thesis title *On a variational approach for Stokes conjectures in water waves*, June 2008. Current: Colegiul National, Costache Negri, Romania.

- Bernardo Sousa (co-advisor with Irene Fonseca), Ph.D., thesis title *Variational Methods for Phase Transitions,* June 2008; Current: University of Toronto, Canada
- Daniel Spector, Ph.D., thesis title *Characterizing Sobolev and BV functions*, May 2011; Current: Okinawa Institute of Science and technology, Japan (associate professor).
- Paolo Piovano (co-advisor with Irene Fonseca), Ph.D., thesis title *Evolution and regularity results for epitaxially strained thin films and material voids*, June 2012. Current: University of Vienna, Austria
- Ryan Murray (co-advisor with Robert Pego), Ph.D., thesis title *Some Asymptotic Results For Phase Transition Models*, May 2016. Current: NC State University (tenure-track)
- Matteo Rinaldi (co-advisor with Irene Fonseca), Ph.D., thesis title *Dynamics of Phase Separation and Pattern Formation*, May 2017. Current: Industry (VENMO)
- Giovanni Gravina, Ph.D., thesis title *Variational Techniques for Water Waves and Singular Perturbations,* May 2019. Current: Temple University.
- Kerrek Stinson, Ph.D., thesis title *Analysis of a Variational Model for Lithium-Ion Batteries,* May 2021. Current: Bonn University, Germany.

Postdoctoral Associates

- Massimiliano Morini, 2002-2004; CNA; co-mentored with I. Fonseca; currently: full professor at University of Parma, Italy.
- Vincent Millot, 2005-2007; CNA; co-mentored with I. Fonseca; currently: University of Paris 7, France.
- Marco Barchiesi, 2007-2009; CNA; co-mentored with I. Fonseca; currently: assistant professor at University of Naples, Italy.
- Filippo Cagnetti, 2008-2010, funded by the ICTI CMU|Portugal Program in Applied Mathematics; co-mentored with I. Fonseca; currently: lecturer In mathematics at University of Sussex, England.
- Milena Chermisi, 2008-2010, funded by the ICTI CMU|Portugal Program in Applied Mathematics; co-mentored with I. Fonseca; currently: private industry.
- Michael Goldman, 2011, CNA, co-mentored with I. Fonseca; currently: junior CNRS researcher at University of Paris 7, France.
- Timothy Blass, 2011-2014, funded by the PIRE NSF award; co-mentored with I. Fonseca and D. Kinderlehrer; currently: data scientist at Capital One.
- Gurgen Hayrapetyan, 2011-2014, funded by the RTG NSF award, co-mentored with I. Fonseca; currently: currently: assistant professor at Ohio University.
- Marco Morandotti, 2011-2013, funded by the ICTI CMU|Portugal Program in Applied Mathematics; co-mentored with I. Fonseca; currently: postdoctoral fellow at SISSA, Italy.
- Xinyang Lu, 2012-2015, funded by the ICTI CMU|Portugal Program in Applied Mathematics; co-mentored with I. Fonseca and Dejan Slepčev; currently: assistant professor at Lakehead University, Canada;
- Emanuel Indrei, 2013-2016, funded by the PIRE NSF award; co-mentored with I. Fonseca; currently: assistant professor at Purdue University
- Laurent Dietrich, 2015-2017, funded by PIRE NSF award; co-mentored with I. Fonseca and with D. Kinderlehrer, currently assistant professor, Toulouse University, France.

- Marco Carroccia, 2015-2018, funded by the ICTI CMU|Portugal Program in Applied Mathematics; co-mentored with I. Fonseca; currently: postdoctoral fellow at Scuola Normale Superiore of Pisa and University of Florence, Italy.
- Peter Gladbach 2016-2017 co-mentored with I. Fonseca.
- Riccardo Cristoferi, 2015-2018, funded by the Fonseca's NSF personal grant; co-mentored with I. Fonseca; currently at Heriot-Watt University, UK.
- Lei Wu, 2015-2018, funded by PIRE NSF award; co-mentored with I. Fonseca and I. Tice; currently at Lehigh University.
- Janusz Ginster 2016-2018, co-mentored with I. Fonseca, currently at Humboldt University, Germany.
- Ethan O'brien 2017-2019, co-mentored with I. Fonseca, currently at University of Arizona.
- Stephan Wojtowytsch, 2017-2019, co-mentored with I. Fonseca, currently at Princeton University.
- Eric Baer, 2018-2020, co-mentored with I. Fonseca, currently at University of Chicago.
- Sean McCurdy, 2019-2021, co-mentored with I. Fonseca, currently at National Taiwan Normal University, Taiwan.
- Adam Prosinski, 2019-2021, co-mentored with I. Fonseca, currently private industry.

Department Committees

- member of the Graduate students' core requirements committee;
- member Graduate Student Recruiting Committee until 2017.
- member of the Graduate student' retention committee;
- member of the Colloquia committee until 2017;
- chair of the math Undergraduate curriculum committee, Sept. 2010-present;
- member, Applied Analysis graduate curriculum committee, January 2016-present;
- chair of the math postdoctoral search committee, Sept. 2021-present;

University Committees

- MCS Ad-Hoc Tenure Committee, 2012/2013.
- Member of the Julius Ashkin selection committee, 2014-2017 and 2019-2020.
- MCS Ad-Hoc Tenure Committee, 2015/2016.
- Chair elect MCS, 2016/2017; Chair MCS, 2017/2018
- College Council, 2016-2018.
- MCS Review Committee 2017/2018

Visiting positions

- 6-15/7-10-96 *School of Mathematics, University of Minnesota*, Minneapolis;
- 1-15/5-15-97 *Postdoctoral Associate, Center for Nonlinear Analysis, Carnegie Mellon University*;
- 10-26/11-30-1997, *School of Mathematics, University of Minnesota*, Minneapolis;
- 5-16/5-30-1998 *Max Planck Institute*, Leipzig, Germany;
- 6-29/7-19-1998, *School of Mathematics, University of Minnesota*, Minneapolis;
- 3-1/3-27-1999 *Center for Nonlinear Analysis, Carnegie Mellon University*;
- 5-16/5-20-1999 *S.I.S.S.A.*, Trieste, Italy;
- 1-4/1-13-2000 *C.M.A.F.*, Lisbon, Portugal;
- 3-5/4-15-2000 *Center for Nonlinear Analysis, Carnegie Mellon University*;
- 6-8/6-19 2000 *C.M.A.F.*, Lisbon, Portugal;

- 9-3/9-13-2000 *Department of Mathematical Analysis, Charles University*, Prague, Czech Republic;
- 4-17/5-18-2001 *Center for Nonlinear Analysis, Carnegie Mellon University*;
- 5-27/5-31-2001 *Mathematical Institute, University of Oxford*, Oxford, UK;
- 3-5/4-15-2002 *Center for Nonlinear Analysis, Carnegie Mellon University*;
- 5-5/5-25-2002 Research in Pairs *Mathematisches Forschungsinstitut Oberwolfach,* Oberwolfach, Germany;
- 6-8/6-20-2003 *Institute for Advanced Studies,* Princeton;
- 6-29/7-7-2003 *Département de Mathématiques*, Université de Toulon et du Var, La Garde Cedex, France;
- 7-13/7-16-2003 *Department of Mathematics*, University of Rome "la Sapienza", Italy;
- 8-10/8-15-2003, *Fachbereich Mathematik*, Universität Dortmund, Dortmund, Germany;
- 7-3/7-19-2004 *Département de Mathématiques*, Université de Toulon et du Var, La Garde Cedex, France;
- 7-19/8-9-2004 *Center for Mathematical Analysis, Geometry, and Dynamical Systems* at Instituto Superior Técnico, Lisbon, Portugal;
- 8-20/8-23-2004 *Department of Mathematics*, University of Naples, Italy;
- 1-2/1-6-2005 *Department of Mathematics*, University of Rome "la Sapienza", Italy;
- 1-2/1-8-2006 *Department of Mathematics*, University of Rome "la Sapienza", Italy;
- 7-18/7-31-2006 *Department of Mathematics*, University of Florence, Italy;
- 7-3/7-16-2007 S.I.S.S.A, Trieste, Italy.
- 7-13/7-21-2008 S.I.S.S.A, Trieste, Italy.
- 7-21/7-23-2008 *Department of Mathematics*, University of Naples, Italy;
- 2-28/3-28-2009 *Centre for Mathematics and its Applications*, The Australian National University, Canberra, Australia;
- 7-4/7-18-2009 *S.I.S.S.A*, Trieste, Italy;
- 7-20/7-27-2010 *S.I.S.S.A*, Trieste, Italy;
- 12-12/12-17-2010 *Department of Mathematics*, University of Parma, Italy.
- 7-15/7-27-2012 *Universidade Nova de Lisboa*, Lisbon, Portugal;
- 6-21/6-30-2013 *University of Pavia,* Pavia, Italy;
- 6-14/6-19-2015 *University of Pavia,* Pavia, Italy.
- 5-27/6-7-2019 *University of Pavia,* Pavia, Italy.

Invited lectures

- January 1992 four lectures, *School of Mathematics, University of Minnesota*, Minneapolis;
- 6-3-1996 conference, *Department of Pure Mathematics, Delft University of Technology*, Delft, Holland;
- 2-14-1997 conference, *Center for Nonlinear Analysis, Carnegie Mellon University*;
- 11-9-1997 conference, *School of Mathematics, University of Minnesota*; Minneapolis;
- 3-9-1999 conference, *Center for Nonlinear Analysis , Carnegie Mellon University*;
- 5-4-1999 conference *Department of Mathematics, University of Rome Tor Vergata,* Rome, Italy;
- 5-19-1999 conference, *S.I.S.S.A.*, Trieste, Italy;
- 3-22-2000 conference, *Center for Nonlinear Analysis, Carnegie Mellon University*;
- 5-24-2000 conference *Department of Mathematics, University of Pavia,* Pavia, Italy;

- 6-5-2000 conference *C.M.A.F. University Lisbon, Lisbon, Portugal*;
- 9-13-2000 conference *Department of Mathematical Analysis, Charles University*, Prague, Czech Republic;
- 3-21-2001 conference *Dipartimento di Metodi e Modelli Matematici per le Scienze Applicate, University of Roma "La Sapienza"*, Rome;
- 3-22-2001 conference *Department of Mathematics and Computer Sciences, University of Perugia*, Perugia, Italy;
- 4-19-2001 conference, *Center for Nonlinear Analysis, Carnegie Mellon University*;
- 5- 28-2001 conference, *Mathematical Institute, University of Oxford*, Oxford, UK;
- 7-11-2001 conference, *Department of Mathematics, Politecnico di Milano,* Milan, Italy;
- 11-7-2001 colloquium, *Center for Nonlinear Analysis* of *Carnegie Mellon University*;
- 3-6-2002 conference *Department of Mathematics "U. Dini", University of Florence,* Florence, Italy;
- 3-12-2002 conference, *Department of Mathematics,* University of Milan*, Milan,* Italy;
- 4-16-2002 conference, *Carnegie Mellon University*;
- 7-3-2003 conference *Département de Mathématiques*, Université de Toulon et du Var, La Garde Cedex, France;
- 7-8-2003 conference *Department of Mathematics, University of Pavia,* Pavia, Italy;
- 7-14-2003 conference *Department of Mathematics*, University of Rome "la Sapienza";
- 6-6/6-18-2004 Ph. D. Course in Calculus of Variations, *Department of Mathematics, University of Pavia,* Pavia, Italy;
- 7-15-2004 conference *Département de Mathématiques*, Université de Toulon et du Var, La Garde Cedex, France;
- 7-20-2004 conference, *Center for Mathematical Analysis, Geometry, and Dynamical Systems* at Instituto Superior Técnico, Lisbon, Portugal;
- 3-31-2005 conference *Mathematics Department*, University of Maryland;
- 4-1-2005 colloquium, *Department of Mathematics*, University of Pittsburgh;
- 8-19-2008 conference *School of Mathematics*, Georgia Institute of Technology;
- 7-8-2009 conference, *S.I.S.S.A*, Trieste, Italy;
- 10-30-2009 colloquium, *Department of Mathematics*, University of Pittsburgh;
- 10-20-2011 seminar, *Department of Mathematics*, University of Puerto Rico;
- 3-08-2012 seminar, *Department of Mathematics*, University of Texas, Austin;
- 7-25-2012 seminar, *C.M.A.F.*, Lisbon, Portugal;
- 10-24-2012 applied mathematics seminar, *Department of Mathematics*, University of Pittsburgh;
- 04-01-2014 colloquium, *School of Mathematics*, University of Minnesota;
- 03-11-2015 applied mathematics seminar, *Department of Mathematics*, University of California, Riverside;
- 06-16-2015 seminar, *Department of Mathematics*, University of Pavia, Italy.
- 10-20-2017 seminar, *Department of Mathematics*, Columbia University.
- 06-04-2019 seminar, *Department of Mathematics*, University of Pavia, Italy.
- 03-18-2021 "On Hardy-type inequalities in fractional Sobolev spaces" Corona Seminar (Zoom).
- 05-14-2021 "Some remarks on homogeneous fractional Sobolev spaces" Nonlinear Analysis Seminar Series, OIST, Japan.

- 01-13-2022 The 49th pde seminar via Zoom, Chinese Academy of Sciences, China.

Plenary speaker at conferences, workshops, and summer schools

- *Symposium on Partial Differential Equations to celebrate the Seventy-Fifth Birthday of James Serrin*, University of Perugia, Italy, 6-28-2002;
- *International Workshop on New Developments in Nonlinear Partial Differential Equations*, University of Minnesota, Minneapolis, 23-25 june 2004;
- Symposium *Principles, Methods, and Taste in Continuum Mechanics, Physics, and Mathematical Analysis* in honor of Mort Gurtin's 70th birthday, Carnegie Mellon University, Pittsburgh, 26-28 June, 2004;
- Conference *Calculus of Variations and PDE: challenges and applications,* Toledo (Spain) August 16-19, 2006;
- Workshop *New Trends in Partial Differential Equations and Calculus of Variations*, Cortona, Italy, May 6-12, 2007;
- Workshop *CNA-Chile New Developments in Partial Differential Equations I,* Carnegie Mellon University, Pittsburgh, May 21-24, 2007;
- Workshop *CNA-Chile New Developments in Partial Differential Equations II*, Santiago, Chile, January 7-10, 2008;
- *Workshop on Nonlinear Analysis*, Centre for Mathematics and its Applications, The Australian National University, Canberra, Australia, March 18-19, 2009;
- *Workshop on Calculus of Variations*, Ancona, Italy, June 6-8, 2011;
- Workshop *Variational Views in Mechanics and Materials,* Pavia, Italy, June 24-26, 2013.
- 2013 CNA Summer School *Topics in Nonlinear PDEs and Calculus of Variations, and Applications in Materials Science*, Center for Nonlinear Analysis, Carnegie Mellon University, Pittsburgh, PA, May 30–June 7, 2013.
- International Workshop "*Advances in Nonlinear Analysis*", University of Pittsburgh, March 13-15, 2014.
- ERC Workshop on *Existence and Regularity for Nonlinear Systems of Partial Differential Equations*, De Giorgi Center, Pisa, Italy, June 30–July 4, 2014.
- ERC School on *Free Discontinuity Problems*, De Giorgi Center, Pisa, Italy, July 7–July 11, 2014.
- Workshop *Multiscale Modeling and Emergence*, February 7 - 8 , 2015, Center for Philosophy of Science, University of Pittsburgh, Pittsburgh.
- Conference "*Recent Developments in Continuum mechanics and PDEs*" University of Nebraska, Lincoln, April 18 - 19, 2015.
- One week minicourse at the intensive period *Variational Methods for Plasticity and Dislocations,* SISSA, Trieste, Italy, June 11-15, 2015.
- Conference on *Calculus of Variations, PDE, and Geometric Measure Theory*, University of Sussex, UK, 7-8 September 2015.
- *9th European Conference on Elliptic and Parabolic Problems,* Gaeta, Italy, May 23-27, 2016.
- *Fourth workshop on thin structures*, Naples, Italy, September 8-10, 2016.
- Conference on *Partial Differential Equations and Related Topics*, Alghero, Sardinia, Italy, September 12-16, 2016.
- *78th Midwest PDE Seminar*, October 15-16, 2016, Loyola University Chicago.

- Conference *James SERRIN: from His legacy to the new frontiers*, Perugia, Italy, January 30 - February 3, 2017.
- Workshop *New Trends on Calculus of Variations and PDE's, with a special tribute to Paolo Marcellini*, Firenze-Montecatini, Italy, June 12-15, 2017.
- Conference *Nonlocal interactions: Dislocations and beyond*, University of Bath, UK, 11-14 June 2018.
- Keynote Speaker at the ESI Workshop: *New trends in the variational modeling of failure phenomena,* ESI, Vienna, Austria, August 20-24, 2018.
- Workshop: *Calculus of Variations on Schiermonnikoog*, Schiermonnikoog, the Netherlands, July 1 to July 5, 2019.
- Workshop: *Modeling of Crystalline Interfaces and Thin Film Structures: A Joint Mathematics-Physics Symposium,* ESI, Vienna, Austria, November 11-15, 2019.
- Conference: *Calculus of Variations and applications, An International Conference to celebrate Gianni Dal Maso's 65th Birthday,* January 27-February 1, 2020, SISSA, Trieste.
- SMI Summer School, Cortona, Italy: *Function spaces and generalized regularity.* July 5-16, 2021. Co-taught with Ian Tice.

Communications at congresses

- communication at the meeting *Sistemi Hamiltoniani, equazioni alle derivate parziali, fluidodinamica, processi diffusivi*, L'Aquila, 4-28 / 4-30–1994;
- communication at the meeting XV Congresso UMI, Padova, 9-11 / 9-16–1995;
- communication at the meeting *Fifth Colloquium on the Qualitative theory of Differential Equations*, Szeged, Hungary 7-29 / 8-2–1996;
- conference at the meeting *Giornata sulle equazioni differenziali*, Trieste, Italy, 4-2–1996;
- communication at the meeting Convegno *40 %*, Montecatini, 2-19 / 2-21–1998;
- communication at the meeting Convegno 40 % *Giornate di Analisi Nolineare*, S.I.S.S.A., Trieste, 6-1 / 6-4–1999;
- communication at the meeting XVI Congresso UMI, Naples, 9-13 / 9-18–1999;
- conference at the meeting Convegno 40 % *Analisi Nolineare*, Perugia, 11-9 / 11–11–2000;
- 6-13-2002 conference, AMS-UMI First Joint Meeting, Session "Contemporary Developments in Partial Differential Equations and in the Calculus of Variations", Pisa, Italy;
- conference, Canadian Mathematical Society's Annual Winter Meeting, minisymposium "Nonlinear Partial Differential Equations" 12-6 /12- 8-2003, Vancouver, Canada;
- communication, Fourth SIAM Conference on Mathematical Aspects of Materials Science, minisymposium on *Contemporary Calculus of Variations for Advanced Materials*, 24-25 May 2004, Hyatt Regency, Macy Plaza, Downtown Los Angeles;
- lecture, *The second Summer School of the Center for Nonlinear Analysis* (CNA), Carnegie Mellon University, May 27, 2004 -June 5, 2004;
- communication, SIAM Conference on Analysis of Partial Differential Equations, minisymposium *Calculus of Variations, PDE and Mass Transport*, December 6-8, 2004, Houston, Texas;

- communication, SIAM Conference on Analysis of Partial Differential Equations, minisymposium *Analysis of Front Propagation and Its Applications*, July 10-12, 2006, Boston, Massachusetts;
- communication, AMS Special Session on *Nonconvex Variational Problems: Recent Advances and Applications*, October 7-8, 2006, University of Utah, Salt Lake City, Utah;
- communication, SIAM Conference on Mathematical Aspects of Materials Science, minisymposium on *Dislocations - from Atomistic to Continuum Models*, 23-26 May 2010, Los Angeles, California;
- communication, ICIAM 2011, minisymposium on *Multiscale Phenomena in Calculus of Variations and Inverse Problems,* July 18 – 22, 2011, Vancouver, BC, Canada;
- communication, ICIAM 2011, minisymposium on *Modern Methods and Applications of the Calculus of Variations,* July 18 – 22, 2011, Vancouver, BC, Canada;
- communication, SIAM Conference on Analysis of Partial Differential Equations, minisymposium *Singularities in Physical systems and the Calculus of Variations,* November 14-17, 2011, San Diego, California;
- communication, 2013 Joint Mathematics Meetings, AMS Special Session on *Recent Advances and New Challenges in Applied Analysis*, January 9-12, 2013, San Diego, California;
- communication, SIAM Conference on Mathematical Aspects of Materials Science, minisymposium *Mathematical Methods for Epitaxial Grow*, June 8-12, 2013, Philadelphia.
- 50 minutes talk, 2015 International meeting, AMS-EMS-SPM, June 10-13, 2015, Porto, Portugal, Special session *Mathematical Models for Materials.*
- communication, SIAM Conference on Mathematical Aspects of Materials Science, minisymposium *Variational Methods for Rods and Shells,* May 8-12, 2016, Philadelphia.
- communication, special session *Advances in the mathematical modeling of failure phenomena and interfaces* in materials at the 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications conference, Orlando (Florida), July 1-5, 2016.
- communication, SIAM Conference on Mathematical Aspects of Materials Science, minisymposium *Analytical Methods for Singular Phenomena in Materials Science,* Portland, July 9-13, 2018.

Participation at congresses

- 5-17/5-18-1991 meeting, *Degenerate Diffusions*, *Institute for Mathematics and its Applications* dell' *University of Minnesota*, Minneapolis, U.S.A., 65th birthday of Prof. J. Serrin;
- 1-2/1-6-1995 Seconda Conferenza Internazionale, *Nonlinear Evolution Problems*, Roma, Italy;
- 9-30/10-4-1996 meeting *Conferenze in onore di Calogero Vinti*, Perugia, Italy;
- 4-18/4-20-1997 meeting *Future Directions in Mathematical Sciences*, *Institute for Mathematics and its Applications* , *University of Minnesota*, Minneapolis, U.S.A.
- 5-23/5-28-1997 meeting *The conjecture of Mumford-Shah and related problems*, *Palazzone*, Cortona, Italy;

- 10-14/10-17-1997 meeting *Equazioni Differenziali e Calcolo delle Variazioni*, *Hotel Le Picchiae*, Picchiae, Isola d'Elba, Italy;
- 10–20/10-23-1997 *Convegno in memoria di Ennio de Giorgi*, *Scuola Normale Superiore* di Pisa, Italy;
- 6-21/6-25-1999 meeting *Shape Optimization and Related Topics*, *CIRM* Lumini (Marsiglia), France;
- 7-2/7-8-2000 workshop *Calculus of Variations*, *Mathematisches Forschungsinstitut Oberwolfach,* Oberwolfach, Germany;
- 7-4/7-6-2001 meeting *Variational methods for discontinuous structures*, *Villa Erba*, Cernobbio, Italy;
- 10-24/10-27-2001 workshop *The Mathematics of Ennio De Giorgi,* Scuola Normale Superiore of Pisa from October 24 to October 27, 2001;
- 11-8/11-11-2001 *Symposium to celebrate 75th birthday of James Serrin, School of Mathematics* of the *University of Minnesota*, Minneapolis, U.S.A.;
- 12-13/12-15-2001 meeting *Mathematical Models in Material Sciences,* December 1 Bressanone, Italy.
- 2-17/2-22-2002 *Geometric Measure Theory and Calculus of Variations*, Levico Terme (Trento) Italy;
- 6-30/7–6-2002 workshop *Calculus of Variations, Mathematisches Forschungsinstitut Oberwolfach,* Oberwolfach, Germany;
- 11-12/11-16-2002, workshop *Quasiconvexity and its applications*, Princeton University, Princeton, NJ, USA;
- 4-11/4-12-2003 *US/EU Meeting on Phase Transitions in Crystals and TMR Annual Meeting*, University of Minnesota, Minneapolis;
- 8-6/8-13-2011 workshop *Partial differential equations*, Mathematisches Forschungsinstitut Oberwolfach*, Oberwolfach, Germany;
- 9-26-/9-28-2011 workshop *Pattern Formation and Multiscale Phenomena in Materials*, University of Oxford, England;

Reviews of Publications and Research Proposals

- referee for the journals *Advances in Calculus of Variations; Annali di Matematica Pura ed Applicata; Annali Scuola Normale Superiore di Pisa; Applied Mathematics and Optimization; Archive for Rational Mechanics and Analysis; Atti Sem. Mat. Fis. Univ. Modena; Calculus of Variations and Partial Differential Equations; Communications in Contemporary Mathematics; Communications in Partial differential Equations; Communications on Pure and Applied Mathematics; Comptes rendus - Mathematics journal; Differential Integral Equations; ESAIM: Control, Optimization and Calculus of Variations; Forum Mathematicum; Interfaces and Free Boundaries; International Journal of Mathematics and Mathematical Sciences; Journal of Differential Equations; Journal of the European Mathematical Society (JEMS); Journal of Fixed Point Theory and Applications; Journal of Functional Analysis; Journal of Mathematical Analysis and Applications; Journal of Nonlinear Analysis; Journal of Nonlinear Science; Multiscale Modeling and Simulation, Nonlinear Differential Equations and Applications (NODEA), Proceedings Royal Society Edinburgh; Rendiconti del Circolo Matematico di Palermo; SIAM Journal Applied Mathematics; SIAM Journal on Control and Optimization; SIAM Journal of Mathematical Analysis; SIAM Multiscale Modeling and Simulation; Transactions American Mathematical Society;*

- reviewer for *Mathematical Reviews.*
- Reviewer of NSF and NSERC Research Proposals;
- Reviewer of Research Councils UK (RCUK) Research Proposals
- Reviewer of Deutsche Forschungsgemeinschaft (German Research Foundation) Research Proposals.

Other scientific activities

- 1999-2002 coordinator of the research project (ex 60 %) *Mathematical models ad methods and their applications*, local unit with 11 members;
- Organizer, together with M. Morini and M. Rieger, of the workshop *Advances in Nonlinear Analysis*, Carnegie Mellon University, May 30-June 1, 2003;
- Organizer, together with I. Fonseca, D. Kinderlehrer and S. Ta'asan of a minisymposium on *Contemporary Calculus of Variations for Advanced Materials*, Fourth SIAM Conference on Mathematical Aspects of Materials Science, 24-25 May 2004, Hyatt Regency, Macy Plaza, Downtown Los Angeles;
- Organizer, together with I. Fonseca, D. Kinderlehrer and S. Ta'asan of *The second Summer School of the Center for Nonlinear Analysis* (CNA), Carnegie Mellon University, May 27, 2004 -June 5, 2004;
- Organizer, together with D. Kinderlehrer of the minisymposium *Calculus of Variations, PDE and Mass Transport*, SIAM Conference on Analysis of Partial Differential Equations, December 6-8, 2004, Houston, Texas;
- Organizer, together with I. Fonseca of the workshop *Workshop on the Calculus of Variations in 2005,* Carnegie Mellon University, October 17-19, 2005;
- Organizer, together with M. Foss of the *Special Session on Calculus of Variations*, 2005 Fall AMS Central Sectional Meeting, 21-23 October 2005, University of Nebraska-Lincoln.
- Organizer, together with I. Fonseca, R. Pego and K. Ramanan of *The third Summer School of the Center for Nonlinear Analysis* (CNA), Carnegie Mellon University, May 29–June 6, 2006;
- Organizer, together with I. Fonseca and M. Morini of the minisymposium *Contemporary Developments in Calculus of Variations and PDE*, SIAM Conference on Analysis of Partial Differential Equations, July 10-12, 2006, Boston, Massachusetts;
- Organizer, together with I. Fonseca, S. Hastings, S. Ta'asan and N. Walkington of *A conference on Applied Analysis on the occasion of the 65th birthday of David Kinderlehrer* (CNA), Carnegie Mellon University, October 19-21, 2006;
- Organizer, together with I. Fonseca and D. Kinderlehrer of the workshop *US-Chile Workshops: new Developments in Partial Differential Equations I*, Carnegie Mellon University, May 21-24, 2007.
- Organizer, together with I. Fonseca and D. Slepcev of the minisymposium *Energy Based Approaches to Nonlinear PDEs*, SIAM Conference on Analysis of Partial Differential Equations, December 10-12, 2007, Mesa, Arizona.
- Organizer, together with N. Fusco, of the Workshop " *New Trends in Calculus of Variations and Mass Transport*" Carnegie Mellon University, March 13-15, 2008.
- Organizer, together with I. Fonseca and D. Slepcev of the minisymposium *Variational Models for Advanced Materials*, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, May 11-14, 2008.

- Organizer, together with I. Fonseca, D. Kinderlehrer, B. Pego, D. Slepcev, S. Ta'asan, N. Walkington of *The fourth Summer School of the Center for Nonlinear Analysis* (CNA), Carnegie Mellon University, May 29–June 6, 2008.
- Co-Chair, together with I. Gamba, of the SIAM conference on Analysis of Partial Differential Equations 09, Miami, Florida, December 7-9, 2009.
- Organizer, together with I. Fonseca of the minisymposium *New Frontiers in Calculus of Variations and Applications to Materials Science*, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, May 23-26, 2010.
- Organizer, together with I. Fonseca and D. Slepcev of *The fifth Summer School of the Center for Nonlinear Analysis* (CNA), Carnegie Mellon University, June 07–June 12, 2010.
- Organizing committee, 2010 SIAM Annual Meeting, Pittsburgh, July 12-16, 2010.
- Organizer, together with I. Fonseca of the minisymposium *Recent Advances in Calculus of Variations and Partial Differential Equations*, 2010 SIAM Annual Meeting, Pittsburgh, July 12-16, 2010.
- Organizer, together with I. Fonseca and I. Tice of *The sixth Summer School of the Center for Nonlinear Analysis* (CNA), Carnegie Mellon University, May 30–June 7, 2013.
- Organizer, together with I. Fonseca of the minisymposium *Mathematical Methods for Epitaxial Grow*, SIAM Conference on Mathematical Aspects of Materials Science, Philadelphia, June 8-12, 2013.
- Organizer, together with Christoph Ortner and Florian Theil of the PIRE Workshop: Atomistic and Multi-Scale Models of Materials, University of Warwick, 15-18 September 2014.
- Organizer, together with John Ball, Robert Kohn, and Peter Palffy-Muhoray of the PIRE-Oxford Workshop *Mathematical Models of Defects and Patterns,* University of New York, January 2016.
- Organizer, together with I. Fonseca of the minisymposium *New Trends in Calculus of Variations and Partial Differential Equations, 9th European Conference on Elliptic and Parabolic Problems,* Gaeta, Italy, May 23-27, 2016.
- Organizer, together with Rustum Choksi, Nicola Fusco, Christopher Larsen of Workshop In Honour of the 60th Birthday of Irene Fonseca *New Challenges for the Calculus of Variations Stemming From Problems in the Materials Sciences and Image Processing*, CRM, Montreal, Canada, May 16-20, 2016.
- Organizer, together with Christoph Ortner, Irene Fonseca, and Stefan Mueller of 2016 PIRE-CNA Summer School New Frontiers in Nonlinear Analysis for Materials June 2-10, 2016. Center for Nonlinear Analysis, Carnegie Mellon University, Pittsburgh, PA.
- Organizer, together with Irene Fonseca, of the special session *New Trends in Calculus of Variations and Partial Differential Equations* at the 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications conference, Orlando (Florida), July 1-5, 2016.
- Organizer, together with Irene Fonseca and Maria Giovanna Mora of the workshop *Topics in the Calculus of Variations: Recent Advances and New Trends*, May 20-25, 2018, Banff Centre, Canada.

- Organizer, together with Riccardo Cristoferi and Irene Fonseca of the minisymposium *Variational Methods in Material Sciences*, SIAM Conference on Mathematical Aspects of Materials Science, Portland, July 9-13, 2018.
- Organizer, together with Kaushik Dayal and Irene Fonseca of the CNA Workshop on *Mathematical Models For Pattern Formation*, CMU, March 8-10, 2019.
- Organizer, together with Elisa Davoli and Rita Ferreira, of the workshop in honour of the 65th Birthday of Irene Fonseca *Variational challenges in materials science and imaging: recent advances and new perspectives,* June 20-24, 2022, Technical University of Vienna, Austria.
- Organizer, together with I. Fonseca and Kerrek Stinson, of the minisymposium *Advances in Variational Methods and Applications to Materials and Machine Learning*, 2022 SIAM Annual Meeting, Pittsburgh, July 11-13, 2022.
- Management committee, Admissions Committee, and Program Committee for The CMU-Portugal ICTI Program in Applied Mathematics until 2017.
- Associate Director of the PIRE "PIRE: Science at the Triple Point Between Mathematics, Mechanics and Materials Science", 2011–2017.
- Associate Director of the Center for Nonlinear Analysis, January 2011–2016.

Scientific Panels

- NSF Math Panel, 2015, 2018.

Current research interests

My current research interests lie in calculus of variations, partial differential equations and geometric measure theory with special emphasis on applications to problems in continuum mechanics, in materials science, and in imaging. Recent areas of focus have been: variational problems involving material defects, such as dislocations; the epitaxial growth of a thin film over a crystalline substrate; phase field models for anisotropic crystalline energies.

Theses

- *Stabilità asintotica globale per sistemi variazionali della forma*

$$(g(r)\nabla_p G(u, u'))' + g(r)\{f(r, u) - \nabla_u G(u, u')\} = 0,$$

  Bachelor thesis, University of Modena (1990);
- *Existence and Asymptotic stability for perturbed Lagrangian and Hamiltonian systems*, Ph.D. thesis, University of Minnesota (1995);

List of publications

(1) G. Leoni, M. Manfredini, and P. Pucci, *Stability properties for solutions of general Euler-Lagrange systems*, Differential and Integral Equations **5** (1992) 537–552;

(2) G. Leoni, *A note on a theorem of Pucci & Serrin*, J. Diff. Equations **113** (1994) 535–542;

(3) G. Leoni, *Asymptotic stability for perturbed Hamiltonian systems*, Archive Rational Mech. Anal. **128** (1994) 105–125;

(4) G. Leoni, *Existence of solutions for holonomic dynamical systems with homogeneous boundary conditions*, J. Nonlinear Analysis **23** (1994) 427–445;

(5) G. Leoni, *Asymptotic stability for the differential system $u'' + \sigma(t)|u|^\alpha |u'|^\beta u' + f(u) = 0$*, Advances in Differential Equations **1** (1996) 111–132;

(6) G. Leoni, *Asymptotic stability for perturbed Hamiltonian systems, II*, Annali Scuola Norm. Sup. Pisa Scien. Fis. Mat. Serie IV **XXIII** (1996) 531–549;

(7) G. Leoni, *A very singular solution for the porous media equation $u_t = \Delta(u^m) - u^p$ when $0 < m < 1$*, J. Diff. Equations **132** (1996) 353–376;

(8) G. Leoni, *Existence of solutions for strongly degenerate differential systems*, Calc. Var. Partial Differential Equations **5** (1997) 435–462;

(9) G. Leoni, *On very singular selfsimilar solutions for the porous media equation with absorption*, Differential and Integral Equations **10** (1997) 1123–1140;

(10) G. Leoni, *Classification of positive solutions for the elliptic equation $\mathrm{div}(|\nabla u|^{p-2}\nabla u) + x \cdot \nabla(u^q) + \alpha\, u^q = 0$ in $\mathbb{R}^N$* Differential Equations **34** (1998) 1172-1180;

(11) I. Fonseca and G. Leoni, *Bulk and contact energies: relaxation and nucleation*, SIAM Journ. Math. Anal. **30** (1999) 190–219;

(12) P. Cermelli, M. Gurtin, and G. Leoni, *Energies for incoherent interfaces: an analytical approach*, Interfaces and Free Boundaries **1** (1999) 81–105;

(13) I. Fonseca and G. Leoni, *Some remarks on lower semicontinuity*, Indiana Univ. Math. J. **49** (2000) 617–635;

(14) A. Braides, I. Fonseca, and G. Leoni, *A-quasiconvexity: relaxation and homogenization*, ESAIM: Control, Optimization and Calculus of Variations, **5** (2000) 539–577;

(15) I. Fonseca and G. Leoni, *On lower semicontinuity and relaxation*, Proceedings Royal Society Edinburgh **131A** (2001) 519–565;

(16) P. Cermelli and G. Leoni, *Interfacial energies for incoherent inclusions*, Archive Rational Mech. Anal. **159** (2001) 335–361;

(17) I. Fonseca, G. Leoni, J. Malỳ and R. Paroni, *A note on Meyers' Theorem in $W^{k,1}$*, Trans. Amer. Math. Soc. **354** (2002) 3723–3741;

(18) S. Conti, I. Fonseca, and G. Leoni, *A Γ-convergence result for the two-gradient theory of phase transitions*, Comm. Pure Appl. Math. **55** (2002) 857–936;

(19) G. Bouchitté, I. Fonseca, G. Leoni, and L. Mascharenhas, *A global method for relaxation in $W^{1,p}$ and in SBV_p*, Arch. Ration. Mech. Anal. **165** (2002) 187–242;

(20) G. Leoni and M. Morini, *Some remarks on the analyticity of minimizers of free discontinuity problems*, J. Math. Pures Appl. **82** (2003) 533–551;

(21) I. Fonseca, G. Leoni, and R. Paroni, *On lower semicontinuity in BH and 2-quasiconvexification*, Calc. Var. Partial Differential Equations **17** (2003) 283–309;

(22) V. De Cicco and G. Leoni, *A chain rule in $L^1(\mathrm{div};\Omega)$ and its applications to lower semicontinuity*, Calc. Var. Partial Differential Equations **19** (2004) 23–51;

(23) G. Dal maso, I. Fonseca, G. Leoni, and M. Morini, *Higher Order Quasiconvexity Reduces to Quasiconvexity*, Archive Rational Mech. Anal. **171** (2004) 55–81;

(24) I. Fonseca, G. Leoni, and S. Müller, *A-quasiconvexity: the gap problem*, Ann. Inst. H. Poincaré Anal. Non Linéaire **21** (2004) 209–236;

(25) I. Fonseca, G. Leoni, and R. Paroni, *On Hessian matrices in the space BH*, Commun. Contemp. Math. **7** (2005) 401–420;

(26) H. Koch, G. Leoni, and M. Morini, *On optimal regularity of free boundary problems and a conjecture of De Giorgi*, Comm. Pure Appl. Math. **58** (2005) 1051–1076;

(27) I. Fonseca, G. Leoni, and J. Malỳ *Weak continuity and lower semicontinuity results for determinants*, Archive Rational Mech. Anal. **178** (2005) 411–448;

(28) P. Cermelli and G. Leoni, *Renormalized Energy and Forces on Dislocations*, SIAM Journ. Math. Anal. **37** (2005) 1131–1160;

(29) G. Leoni and M. Morini, *Necessary and sufficient conditions for the chain rule in $W^{1,1}_{\mathrm{loc}}\left(\mathbb{R}^N;\mathbb{R}^d\right)$ and $BV_{\mathrm{loc}}\left(\mathbb{R}^N;\mathbb{R}^d\right)$*, J. Eur. Math. Soc. (JEMS) **9** (2007) 219–252;

(30) I. Fonseca, G. Francfort, and G. Leoni, *Thin elastic films: the impact of higher order perturbations,* Quart. Appl. Math. **65** (2007) 69–98;

(31) I. Fonseca, N. Fusco, G. Leoni, and M. Morini, *Equilibrium configurations of epitaxially strained crystalline films: existence and regularity results,* Arch. Rational Mech. Anal. **186** (2007) 477–537;

(32) G. Dal Maso, I. Fonseca, G. Leoni, and M. Morini, *A higher order model for image restoration: the one dimensional case,* SIAM Journ. Math. Anal. **40** (2009) 2351–2391;

(33) A. Garroni, G. Leoni, and M. Ponsiglione, *Gradient theory for plasticity via homogenization of discrete dislocations,* J. Eur. Math. Soc. (JEMS) **12** (2010) 1231–1266;

(34) G. Dal maso, I. Fonseca, and G. Leoni, *Nonlocal character of the reduced theory of thin films with higher order perturbations,* Adv. Cal. Var. **3** (2010) 287–319;

(35) I. Fonseca, F. Maggi, G. Leoni, and M. Morini, *Exact reconstruction of damaged color images using a total variation model,* Ann. Inst. H. Poincaré Anal. Non Linéaire **27** (2010), no. 5, 1291–1331;

(36) G. Carita, I. Fonseca, and G. Leoni, *Relaxation in $SBV_p\left(\Omega; S^{d-1}\right)$,* Calc. Var. Partial Differential Equations **42** (2011) 211–255;

(37) N. Fusco, I. Fonseca, G. Leoni, and V. Millot, *Material voids in elastic solids with anisotropic surface energies,* J. Math. Pures Appl. **96** (2011) 591-639;

(38) G. Leoni and D. Spector, *Characterization of Sobolev and BV Spaces,* Journal of Functional Analysis **261** (2011) 2926-2958;

(39) M. Chermisi, G. Dal Maso, and I. Fonseca, and G. Leoni, *Singular perturbation models in phase transitions for second order materials,* Indiana Univ. Math. J. **60** (2011), 367-410;

(40) D. Arama and G. Leoni, *On a variational approach for water waves,* Comm. Partial Differential Equations **37** (2012), 833–874;

(41) I. Fonseca, N. Fusco, G. Leoni, and M. Morini, *Motion of elastic thin films by anisotropic surface diffusion with curvature regularization,* Arch. Rational Mech. Anal. **205** (2012) 425-466;

(42) G. Dal Maso, I. Fonseca, G. Leoni, *Analytical validation of a continuum model for epitaxial growth with elasticity on vicinal surfaces,* Arch. Rational Mech. Anal. **212** (2014) 1037-1064;

(43) G. Leoni, *A remark on the compactness for the Cahn-Hilliard functional,* ESAIM: Control, Optimization and Calculus of Variations **20** (2014) 517–523.

(44) T. Blass, I. Fonseca, G. Leoni, and M. Morandotti, *Dynamics for systems of screw dislocations.* SIAM J. Appl. Math. 75 (2015), no. 2, 393–419.

(45) I. Fonseca, N. Fusco, G. Leoni, and M. Morini, *Motion of three-dimensional elastic films by anisotropic surface diffusion with curvature regularization.* Anal. PDE 8 (2015), no. 2, 373–423.

(46) G. Dal Maso, I. Fonseca, G. Leoni, *Second order asymptotic development for the anisotropic Cahn-Hilliard functional.* Calc. Var. Partial Differential Equations 54 (2015), Issue 1, 1119–1145.

(47) I. Fonseca, G. Leoni, X. Y. Lu, *Regularity for weak solutions of a continuum model for epitaxial growth with elasticity on vicinal surfaces.* Comm. Partial Differential Equations 40 (2015), Issue 10, 1942–1957.

(48) G. Leoni and R. Murray, *Second-order Γ-limit for the Cahn–Hilliard functional.* Arch. Rational Mech. Anal. 219 (2016), 1383–1451.

(49) I. Fonseca, G. Hayrapetyan, G. Leoni, and B. Zwicknagl, *Domain formation in membranes near the onset of instability.* J. Nonlinear Sci. 26 (2016), no. 5, 1191–1225.

(50) I. Fonseca, G. Leoni, and M. Morini, *Equilibria and Dislocations in Epitaxial Growth*, Nonlinear Anal. 154 (2017), 88–121. Special volume, Calculus of Variations, in honor of Nicola Fusco on his 60th birthday.

(51) G. Dal Maso, I. Fonseca, G. Leoni, *Asymptotic analysis of second order nonlocal Cahn-Hilliard-type functionals*, Trans. Amer. Math. Soc. 370 (2018), no. 4, 2785–2823.

(52) I. Fonseca, N. Fusco, G. Leoni, and M. Morini, *A model for dislocations in epitaxially strained elastic films.* J. Math. Pures Appl. (9) 111 (2018), 126–160.

(53) G. Leoni and I. Tice, *Traces for homogeneous Sobolev spaces in infinite strip-like domains.* J. Funct. Anal. 277 (2019), no. 7, 2288–2380.

(54) G. Leoni and R. Murray, *Local minimizers and slow motion for the mass preserving Allen–Cahn equation in higher dimensions.* Proceedings American Mathematical Society, 147 (2019), no. 12, 5167–5182.

(55) I. Fonseca, G.Leoni, M.G. Mora, *A Second order minimality condition for a free-boundary problem.* Annali Scuola Norm. Sup. Pisa Scien. Fis. Mat.19 (2019), no. 4, 1303–1358.

(56) G. Gravina - G. Leoni, *Higher order Gamma-limits for singularly perturbed Dirichlet-Neumann problems.* SIAM J. Math. Anal. 51 (2019), no. 4, 3337–3372.

(57) G. Gravina - G. Leoni, *On the behavior of the free boundary for a one-phase Bernoulli problem with mixed boundary conditions.* Communications on Pure and Applied Analysis. 19 (2020), no. 10, 4853–4878.

(58) G. Gravina - G. Leoni, *On the existence of non-flat profiles for a Bernoulli free boundary problem.* Advances in Calculus of Variations (ACV) 15 (2022), no. 1, 33–58.

(59) G. Leoni and I. Tice, *Traveling wave solutions to the free boundary incompressible Navier-Stokes equations*, to appear in Comm. Pure Appl. Math.

(60) I. Fonseca, N. Fusco, G. Leoni, and M. Morini, *Global and local energy minimizers for a nanowire growth model,* to appear in Ann. Inst. H. Poincaré Anal. Non Linéaire.

Proceedings

(1) G. Leoni, *On the existence of fast-decay solutions for a quasilinear elliptic equation with a gradient term*, Atti Sem. Mat. Fis. Univ. Modena, Supplement to Vol. XLVI dedicated to Prof. Vinti (1998) 827–846;

(2) I. Fonseca and G. Leoni, *Relaxation in Micromagnetics,* Ricerche di Matematica, **XLIX** (2000), Supplement in memory of Ennio De Giorgi, 269-304;

(3) G. Leoni, *On lower semicontinuity in the Calculus of Variations,* Atti del Sedicesimo Congresso dell'Unione Matematica Italiana, Naples 13-18 September 1999, (2000) 537-556;

(4) I. Fonseca and G. Leoni, *Higher Order Variational Problems and Phase Transitions in Nonlinear Elasticity,* Progress in Nonlinear differentail Equations and Their Applications, Vol. 51, 117-140, 2002 Birkhauser;

Books

- I. Fonseca and G. Leoni, *Modern Methods in the Calculus of Variations: L^p Spaces,* Springer Monographs in Mathematics. Springer, New York, 2007.
- G. Leoni, *A First Course in Sobolev Spaces,* Graduate Studies in Mathematics. 105. Providence, RI: American Mathematical Society (AMS), 2009.
- I. Fonseca and G. Leoni, *Calculus of variations,* The Princeton Companion to Applied Mathematics", Princeton University Press, 2015.
- G. Leoni, Variational models for epitaxial growth. Lecture notes. CRM Series, Edizioni della Normale, Scuola Normale Superiore, Pisa, 2016, 84 pages.
- G. Leoni, *A First Course in Sobolev Spaces,* Second edition. Graduate Studies in Mathematics, 181. American Mathematical Society, Providence, RI, 2017. xxii+734 pp. ISBN: 978-1-4704-2921-8
- I. Fonseca and G. Leoni, *Modern Methods in the Calculus of Variations: Sobolev Spaces,* in preparation, accepted for publication by Springer.
- G. Leoni, *A First Course in fractional Sobolev Spaces,* to appear in the series Graduate Studies in Mathematics. American Mathematical Society (AMS), 2023.

Undergraduate Publications

- Timothy Li and G. Leoni, L^1 *regularization for compact support*, SIURO, 11 (2018).