Riccardo Cristoferi

Curriculum Vitae
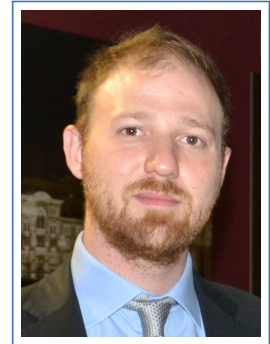
Contacts

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Academic Positions

October 2018
August 2020
	Postdoctoral Associate
	    Heriot-Watt University
	    Mentor: Prof. David Bourne

September 2015
August 2018
	NSF Postdoctoral Associate at the Center for Nonlinear Analysis
	    Carnegie Mellon University
	    Mentor: Prof. Irene Fonseca

Education

September 2011
September 2015
	Ph.D. Degree in Applied Mathematics, *SISSA*, Trieste, Italy
	    Advisor: Prof. Massimiliano Morini
	    Thesis: *On local and global minimizers of some non-convex variational problems*
	    Four years fellowship by SISSA

September 2008
March 2011
	Masters Degree in Mathematics, *University of Trento*, Trento, Italy
	    Advisor: Prof. Francesco Serra Cassano
	    Thesis: *The Bernstein problem in the euclidean and sub-riemannian setting*
	    Two years scholarship by Opera Universitaria of Trento
	    Money prize for academic merits "Premio di Merito" by University of Trento

September 2005
September 2008
	Bachelors Degree in Mathematics, *University of Trento*, Trento, Italy
	    Advisor: Prof. Gabriele H. Greco
	    Thesis: *The Banach-Tarski's paradox and admissible groups* (in Italian)
	    Three years scholarship by Opera Universitaria of Trento

Research Activity

My research is focused on the study of variational models that arise in different situations. In particular, I am interested in problems with a variational nature from Physics, Materials Science, Imaging Science and Big Data. My program addressed both local and nonlocal models. The general goal is to use rigorous mathematical tools to explain how the basic features of a model relate to the experimental observations, thus understanding the phenomenon under investigation and, eventually, validate (or not) the model.

Publications

[8] R. Cristoferi, I. Fonseca, A. Hagerty, C. Popovici
A homogenization result in the gradient theory of phase transitions
Submitted

[7] R. Cristoferi, M. Thorpe
Large data limit for a phase transition model with the p-Laplacian on point clouds
To appear on European J. Appl. Math.

[6] R. Cristoferi
Exact solutions for the denoising problem of piecewise constant images in dimension one
Submitted

[5] R. Cristoferi, I. Fonseca
Piecewise constant reconstruction of damaged color images
To appear on ESAIM: COCV

[4] M. Caroccia, R. Cristoferi, L. Dietrich
Equilibria configurations for epitaxial crystal growth with adatoms
Arch. Ration. Mech. Anal. 230-3 (2018), 785-838

[3] R. Cristoferi
A second order local minimality criterion for the triple junction singularity of the Mumford-Shah functional
ESAIM: COCV 24-1 (2018), 401-435

[2] R. Cristoferi
On periodic critical points and local minimizers of the Ohta-Kawasaki functional
Nonlin. Anal. 168 (2018), 81-109.

[1] M. Bonacini, R. Cristoferi
Local and global minimality results for a nonlocal isoperimetric problem on $\mathbb{R}^N$
SIAM J. Math. Anal. 46-4 (2014), 2310-2349.

Proceedings

M. Bonacini, R. Cristoferi
Local and global minimality results for a nonlocal isoperimetric problem on $\mathbb{R}^N$
Rendiconti Lincei-Matematica e Applicazioni 27-1 (2016), 37-50.

Invited Talks

9th July 2018	*Equilibria configurations for epitaxial crystal growth with adatoms* SIAM Conference on Mathematical Aspects of Materials Science Mini symposium *Variational Methods in Material Sciences* Oregon Convention Center - Portland, Oregon - USA
21st May 2018	*Equilibria configurations for epitaxial crystal growth with adatoms* Topics in the Calculus of Variations: Recent Advances and New Trends BIRS - Banff, Alberta - Canada
25th July 2017	*Periodic critical points of the Ohta-Kawasaki functional* Mathematical Congress of the Americas Montréal - Canada
9th June 2017	*Equilibria configurations for epitaxial crystal growth with adatoms* Oberseminar Mathematik University of Würzburg - Würzburg - Germany
17th February 2017	*On the denoising problem for piecewise constant images in dimension one* VCU Analysis, Logic and Physics Seminar Virginia Commonwealth University - Richmond, Virginia - USA
1st July 2016	*Periodic critical points of the Ohta-Kawasaki functional* IMA Conference on Dynamical Systems, Differential Equations and Applications Mini symposium *Advances in the mathematical modeling of failure phenomena and interfaces in material* organized by Barchiesi, Matias and Morandotti Hyatt Regency - Orlando, Florida - USA
17th June 2016	*An isoperimetric problem with nonlocal repulsive interaction* PIMS Workshop on Nonlocal Variational Problems and PDEs University of British Columbia - Vancouver - Canada
5th February 2015	*Questioni di minimalitá locale e globale per un problema isoperimetrico non locale su $\mathbb{R}^N$* XXV National Meeting of Calculus of Variations Hotel Bellavista - Levico Terme (TN) - Italy
31th July 2014	*Local and global minimality results for a nonlocal isoperimetric problem on $\mathbb{R}^N$* Trends in Non-Linear Analysis 2014 Instituto Superior Técnico - Lisbon - Portugal
8th July 2014	*Local and global minimality results for a nonlocal isoperimetric problem on $\mathbb{R}^N$* ERC School on Free Discontinuity Problems Centro di ricerca matematica Ennio De Giorgi - Pisa - Italy

21th March 2014	*Stability and minimality for a nonlocal isoperimetric problem* AJS seminars SISSA - Trieste - Italy

Visits to Other Institutes

10-16 June 2017, Institute for Applied Mathematics, Bonn

5-9 June 2017, University of Würzburg

16-17 February 2017, Virginia Commonwealth University

5-9 September 2016, Institute for Applied Mathematics,Bonn

Organization Activity

July 2018	Co-organizer, with Irene Fonseca and Giovanni Leoni, of the minisymposium *Variational Methods in Material Sciences* at the SIAM Conference on Mathematical Aspects of Materials Science
Spring 2017	Organizer of the CNA Working Group on *The use of variational techniques in the study of sequences of elliptic operators*
2013 - 2015	Ideator/Organizer of the AJS (Analysis Junior Seminars) at SISSA A series of weekly seminars in order to make each Ph.D./Postdoc student present her/his research to the Analysis area. This activity has been well appreciated by the students and will (hopefully!) continue over the years. The complete list of seminars is available at: http://www.math.sissa.it/content/ajs-seminars

Service

Referee for Arch. Rat. Mech. Anal., Nonlinearity, SIAM J. Math. Anal.

Teaching Activity

Fall 2017	Instructor at Carnegie Mellon University for the undergraduate course *21-260 - Differential Equations*
Spring 2017	Instructor at Carnegie Mellon University for the undergraduate course *21-272 - Introduction to PDEs*
Spring 2016	Instructor at Carnegie Mellon University for the undergraduate course *21-470 - Selected Topics in Analysis: Calculus of Variations*
2009 - 2010	Tutor for the courses of *Analysis I* and *Geometry I (Linear Algebra)* for the first year degree course of Mathematics at University of Trento Weekly meetings with the students of the first year to answer their questions about the lessons and to solve together exercises
2009 - 2010	Summer lessons held for Liceo Scientifico Galileo Galilei - Verona One course for the 1st and 2nd year and one course for the 3rd and 4th year
2009 - 2010	Winter lessons held for Liceo Scientifico Galileo Galilei - Verona One course for the the 2nd year

2008 - 2009	Summer lessons held for Liceo Scientifico Galileo Galilei - Verona
	One course for the 1st and the 2nd year
	All the lessons given at Liceo Scientifico Galileo Galilei were aimed to high school students in the need to catch up with math

Communication of Science

29th May 2017	Conference at Lyceum International Club of Firenze
	I had the honor and the pleasure to give a conference at the Lyceum International Club of Firenze titled *Il pennello di Galileo* (*Galileo's brush*), about the role of Mathematics in scientific investigation, and how math can be used to recolor damaged images
4th April 2016	Interview for *OggiScienza*
	I was interviewed by Luisa Alessio for OggiScienza (italian online magazine about research) on how to use Mathematics, in particular the Calculus of Variations, in the treatment of images. The complete interview (in italian) can be found here: https://oggiscienza.it/2016/04/04/matematica-immagine-modello-energia/
February 2015	Videos for the website *SISSA per la Scuola*
	Thanks to Lisa Zillio we made three videos that are now available on the site *http://medialab.sissa.it/sissaperlascuola/it*. The first two are presentations of myself for primary and high school students. In the third one, titled *Il migliore dei mondi possibili*, I give a general overview of the Calculus of Variations, talking about minimization problems, the least action principle and the Mumford-Shah functional in a language understandable by high school students
11th February 2015	Special day for high school students at SISSA
	Presentation of the seminar *Chi se ne importa della matematica.* (*Who cares about math?*), about the role of mathematics in real life applications
26th - 28th September 2014	Activity for the general public for *SISSA@TriesteNext*
	Interactive activity for childrens about caustics and presentation of the seminar *Chi se ne importa della matematica.* (*Who cares about math?*)
13th June 2014	Activity for the general public for *SISSA in Festa*
	In collaboration with M. Casati we organized a workshop on caustics for adults and children
Jan - Apr 2014	Attended the *SISSA for school* training course in communication of science
	A six days course for SISSA volunteers, organized by Simona Cerrato, on talking about science in different contexts. Courses helded by N. Pitrelli, V. Daelli, P. Rodari, E.M. Balli and B. Markicevic. Last day was devoted to a trip to the House of Experiments in Lubljana (Slovenia)
January 2014	Fact sheets for medium level school textbook edited by Fabbri
	Author on the behalf of SISSA Medialab of three fact sheets titled *The four colours theorem*, *Cantor and the infinity* and *The other mathematics* (about the ancient and medieval indian, chinese and arabian maths), that have been published on a teacher guide integrated in the textbook by Gilda Flaccavento Romano edited by Fabbri, Milano, 2014
2013 - 2015	Volunteer for *SISSA for School*
	Several activities to present the word of academic research to elementary, middle and high school students

Schools Attended

2nd - 10th June 2016	*PIRE-CNA - New Frontiers in Nonlinear Analysis for Materials* Carnegie Mellon University Courses by I. Fonseca, A. Garroni, R. Kohn, R. Kotecky, M. Luskin
7th - 14th July 2014	*ERC School on Free Discontinuity Problems* Centro di ricerca matematica Ennio De Giorgi - Pisa - Italy Courses by M. Focardi, G. Leoni, M. Morini
10th - 14th February 2014	*Winter School on Calculus of Variations in Physics and Materials Science* University of Würzburg - Würzburg - Germany Courses by G. Dal Maso, M. Peletier, Maria G. Westdickenberg
<u>Poster presentation</u>	Local and global minimality results for a nonlocal isoperimetric problem in $\mathbb{R}^N$
9th - 13th September 2013	*Geometric functional inequalities and shape optimization* Accademia Pontaniana - Napoli - Italy Courses by D. Bucur, F. Maggi, M. Morini
30th May - 7th June 2013	*Topics in Nonlinear PDEs and Calculus of Variations, and Applications in Materials Science* Carnegie Mellon University - Pittsburgh, Pennsylvania - USA Courses by J. Ball, B. Dacorogna, N. Fusco, R. James, G. Leoni
<u>Poster presentation</u>	Local and global minimality results for a nonlocal isoperimetric problem in $\mathbb{R}^N$
1st -4th October 2012	*Topics in Calculus of Variations and Applications* University of Parma - Parma - Italy Courses by N. Fusco, M. Ponsiglione, Y. Sire
20th - 24th June 2011	*Seventh School on Analysis and Geometry in metric spaces* Levico Terme (TN) - Italy Courses by U. Boscain, N. Garofalo, T. Iwaniec, J. Maly

Workshops and Conferences Attended

9th - 13rd July 2018	SIAM Conference on Mathematical Aspects of Materials Science Oregon Convention Center - Portland, Oregon - USA
12st - 25th May 2018	Topics in the Calculus of Variations: Recent Advances and New Trends BIRS - Canada
9th - 11th December 2017	*SIAM Conference on Analysis of Partial Differential Equations* The Baltimore conference center - Baltimore, Maryland - USA
24th - 28th July 2017	*Mathematical Congress of the Americas* Montréal - Canada

4th - 7th October 2016	*Calculus of Variations and PDEs* Rettorato Universitá del Salento - Lecce - Italy
19th - 23rd September 2016	*A mathematical tribute to Ennio De Giorgi* On the occasion of the vigintennial of Ennio De Giorgi's departure Palazzo dei Congressi - Pisa - Italy
18th - 20th July 2016	*Topics in Applied Nonlinear Analysis: Recent Advances and New Trends* Conference in honour of David Kinderlehrer's 75th birthday Carnegie Mellon University - Pittsburgh, Pennsyvania - USA
1st - 5th July 2016	*IMA - Conference on Dynamical Systems, Differential Equations and Applications* Workshop in honour of Peter Lax's 90th birthday Hyatt Regency - Orlando, Florida - USA
13rd - 17th June 2016	*PIMS Workshop on Nonlocal Variational Problems and PDEs* University of British Columbia - Vancouver - Canada
16th - 20th May 2016	*New challenges from the Calculus of Variations stemming from problems in the material sciences and image processing* Workshop in honour of Irene Fonseca's 60th Centre de recherches mathématiques - Université de Montréal - Canada
8th - 12nd May 2016	*SIAM - Mathematical Aspects of Materials Science* Sheraton Society Hill Hotel - Philadelphia, Pennsylvania - USA
5th - 8th January 2016	*NYU-Oxford Workshop on Mathematical Models of Defects and Patterns* Courant Institute of Mathematical Sciences, New York University - NY - USA
7th - 10th December 2015	*SIAM - Analysis of Partial Differential Equations* Double Tree Resort Hotel by Hilton - Scottsdale, Arizona - USA
23rd - 25th October 2015 Poster presentation	*Mathematics and Mechanics in the 22nd Century: Seven Decades and Counting...* In the occasion of the 90th birthday of Jerry Ericksen Valley River Inn - Eugene, Oregon - USA On local and global minimizers of the Ohta-Kawasaki model for diblock copolymers
2nd - 6th February 2015	*XXV National Meeting of Calculus of Variations* Levico Terme (TN) - Italy
22th - 24th September 2015	*Variational Modeling in Solid Mechanics* University of Udine - Udine - Italy

31th July - 1st August 2014	*Trends in Nonlinear Analysis 2014* Instituto Superior Técnico - Lisbon - Portugal
27th - 31th January 2014	*XXIV National Meeting of Calculus of Variations* Levico Terme (TN) - Italy
21th - 23th November 2013	*New trends in Calculus of Variations and Partial Differential Equations* In the occasion of the 60th birthday of Carlo Sbordone Accademia Pontaniana - Napoli - Italy
3rd - 8th February 2013	*XXIII National Meeting of Calculus of Variations* Levico Terme (TN) - Italy

Other Activities

2013 - 2015	Vice-President of SISSA Club SISSA Club is a student association that organizes extra-curricula activities with the purpose to offer a wide variety of occasions for SISSA students for meeting together in a non academic enviroment. Our directive board was able to strengthen the association, making it a fundamental part of SISSA social life. As vice-president I looked after the organization of the activities proposed for 2014-2015, collaborating with SISSA Director, SISSA administration and SISSA Medialab
2013 - 2015	Webmaster for the SISSA Analysis web page

Languages

Italian	Native
English	Fluent

Pittsburgh, August 6th 2018   Riccardo Cristoferi