

CURRICULUM VITAE

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**Academic Position:** Associate Professor  
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**Academic Positions**

*April 2013- present :* Associate Professor (tenured), Department of Mathematics and Applied Mathematics, University of Crete, Heraklion and IACM/FORTH, Greece.  
*Sept 2011- March 2013:* Assistant Professor (tenured), Department of Applied Mathematics, University of Crete, Heraklion and IACM/FORTH, Greece.  
*April 2007- Sept 2011:* Assistant Professor (tenure track), Department of Applied Mathematics, University of Crete, and Institute for Applied and Computational Mathematics, FORTH, Greece.  
*Sept 2006- March 2003:* Visiting Associate Professor, Department of Applied Mathematics, University of Crete, Heraklion, Greece.  
*Sept 2005- Aug 2006:* Visiting Assistant Professor, Department of Mathematics and Statistics, University of Massachusetts, Amherst, USA.  
*2003-2005:* Postdoctoral Fellow, Department of Mathematics, University of Toronto, Canada.  
*2002:* Research Fellow, Istituto per le Applicazioni del Calcolo “Mauro Picone”, Rome, Italy.

**Education**

*1999-2002:* Ph.D in Applied Mathematics, University of Athens, Greece.  
 Thesis Advisor: Professor N.D. Alikakos.  
 Title: *Large Time Dynamics of Diffused and Sharp Interfaces (with honors)*.  
*1997-1999:* M.Sc. in Applied Mathematics, University of Athens (*with honors*).  
*1993-1997:* Degree in Mathematics, University of Athens, Greece.

**Research grants/Fellowships**

*2015-2017* Research grant at the University of Crete (*Principal Investigator*); ELKE 4231.  
*2012-2015* “Aristeia I” (Excellence) grant, General Secretariat of Research and Technology, Greece, (*Principal Investigator*); ARISTEIA-193-ΣΠΑ ASMOPH.  
*2010-2014* EU Marie-Curie International Research Staff Exchange Scheme (*Co-Principal Investigator, Responsible of the Greek team*); IRSES-2009-247486 MaNEqui.

2007-2011	EU Marie-Curie International Reintegration Grant ( <i>Principal Investigator</i> ); MIRG-CT-2007-200526 MuSAph.
2008-2010	Research grant at the University of Crete ( <i>Principal Investigator</i> ); ELKE 2740.
2010-2013	“Archimedes Center for Modeling, Analysis and Computation” ( <i>Team Member</i> ); FP7-REGPOT-2009-1 project.
2012 –2015	Thales “AMOSICSS: Analysis, modeling and simulations of complex and stochastic systems” ( <i>Team Member</i> ).
June - Dec. 2002	Individual Postdoctoral Research Fellowship. RTN-European Programme. “Fronts-Singularities” (Grant No. HPRN-CT-2002-00274).
1999-2002	Interdisciplinary grant in materials supported by ΠΕΝΕΔ 99/527 ( <i>graduate student</i> ).
1994-1996	Fellowship from the National Scholarship Foundation (I.K.Y.): for distinguished performance as an undergraduate student.

### **Research Interests**

Applied analysis, partial differential equations, nonlinear analysis, stochastic partial differential equations, deterministic and stochastic problems of phase change, singular perturbation problems, stochastic and deterministic dynamics, asymptotics, mean curvature flow, stochastic motion under mean curvature, kinetics of phase transitions, mathematical methods for multi-scale problems.

### **Teaching**

2007 -	<i>Undergraduate courses:</i> Calculus I, II, Stochastic Processes I, II, Probability Theory, Functional Analysis, Optimization Theory, Analysis I, II. <i>Graduate courses:</i> Partial Differential Equations, Ordinary differential equations, Nonlinear analysis, Stochastic analysis, Stochastic differential equations, Asymptotic analysis, Stochastic Processes, Department of Mathematics and Applied Mathematics, University of Crete, Greece.
2005 - 2006	Calculus I, II, Department of Mathematics, University of Massachusetts, USA.
2003 - 2005	Calculus, Calculus II, Differential Equations, Department of Mathematics, University of Toronto, Canada.

**Referee for research articles submitted in:** Abstract and Applied Analysis, Communications in PDE, Communications in Mathematical Sciences, Communications on Pure and Applied Analysis, Discrete and Continuous Dynamical Systems-A, Differential and Integral Equations, European Journal of Applied Mathematics, Journal of Differential Equations, Nonlinearity, SIAM Journal of Mathematical Analysis, Zeitschrift fuer Angewandte Mathematik und Physik, Journal of Mathematical Analysis and Applications, Electronic Journal of Differential Equations, International Mathematics Research Notices.

### **International Conferences Organizer**

(More details about the conferences can be found at [www.tem.uoc.gr/~gkarali/](http://www.tem.uoc.gr/~gkarali/))

- “Mathematical challenges motivated by multi-phase materials: Analytical, stochastic and discrete aspects”, (June 21-26 2009), Anogia, Crete, Greece.  
(Web-page: [www.tem.uoc.gr/~gkarali/anogia09](http://www.tem.uoc.gr/~gkarali/anogia09))
- “Women in Applied Mathematics”, (May 2-5 2011), Heraklion, Crete, Greece.  
(Web-page: [www.tem.uoc.gr/~gkarali/WAM2011](http://www.tem.uoc.gr/~gkarali/WAM2011))
- “Solitons, vortices, minimal surfaces and their dynamics”, (15-19 July 2013), Institut Mittag-Leffler, Sweden. (Web-page: [www.mittag-leffler.se/summer2013](http://www.mittag-leffler.se/summer2013))
- “International Conference in Applied Mathematics”, (16-19 September 2013), at ACMAC, Archimedes Center for Modeling, Analysis and Computation, Heraklion, Crete. Mini-symposium

with title: *Analysis and stochastics in physical systems*. (Web-page: [www.acmac.uoc.gr](http://www.acmac.uoc.gr))

- “Evolution equations”, (24 September 2014), Heraklion, Crete, Greece. (Web-page: [http://users.tem.uoc.gr/~gkarali/workshop\\_24-9-14.html](http://users.tem.uoc.gr/~gkarali/workshop_24-9-14.html))
- Workshop on “PDEs in physics and material sciences”, (12-13 June 2017), Heraklion, Crete. (Web-page: <http://users.tem.uoc.gr/~gkarali/workshop2017/>)
- Workshop on “PDEs in physics and applications”, (May 10-16 2018), Heraklion, Crete. (Web-page: <http://users.tem.uoc.gr/~gkarali/PDEs2018>)
- “Recent trends in Stochastic Analysis and Partial Differential Equations”, September 5-6 2019, Chester, UK. (Web-page: <https://www1.chester.ac.uk/events/recent-trends-stochastic-analysis-and-partial-differential-equations?list=9826>)

### **Invited Conference and Workshop Talks (selected)**

- July 7-11 2014, AIMS Conference on Dynamical Systems, Differential Equations and Applications. (Invited special session speaker).
- July 15-19 2013, Solitons, vortices, minimal surfaces and their dynamics, Mittag-Leffler Institute, Stockholm, Sweden.
- March 18-20 2012, Reaction Diffusion systems with gradient structure, FIRST Euronetwork workshop, Athens, Greece.
- June 19-21 2012, Workshop on PDE's with random terms, Yuzawa Grand Hotel, Echigo Yuzawa, Japan.
- June 16-18 2012, Summer School on PDE's with random terms, Department of Mathematics, University of Tokyo, Japan.
- April 3-6 2012, Workshop on Numerical Analysis and Mathematical Biology, University of Paris-Sud, Orsay, France.
- June 20-24 2011, Continuum and kinetic methods in the theory of shocks, fronts, dislocations and interfaces, Heraklion, Crete, Greece.
- October 21-24 2010, Interface Motion and Traveling Waves in Reaction-Diffusion Equations, Tongji University, Shanghai, China.
- May 25-28 2010, AIMS Conference on Dynamical Systems, Differential Equations and Applications, Dresden University of Technology, Dresden, Germany.
- February 11-12 2009, Sviluppi Recenti in Fisica Matematica, L'Aquila, Italy.
- December 1- 5 2008, Interplay of Analysis and Probability in Physics, Germany.
- May 15-17 2008, Panhellenic Conference in Mathematical Analysis, Athens, Greece.
- June 17-19 2007, Variational problems and related topics, RIMS, Kyoto, Japan.
- June 2005, CMS summer meeting, Waterloo, Canada.
- March 18-19 2005, AMS Sectional Meeting Session, Bowling Green, KY, USA.
- May 4-6 2003, Workshop on Partial Differential Equations, McMaster University, Canada.
- December 6-8 2004, SIAM Conference on Analysis of Partial Differential Equations, Houston, USA.
- July 8-10 2002, Workshop on Singular Limit Analysis of Reaction-Diffusion Systems, L'Aquila, Italy.
- November 26-28 2001, “Singularities arising in nonlinear problems” (SNP2001), Kyoto, Japan.

### **Invited Seminar and Colloquium Talks (selected)**

- September 2016, Tor Vergata University, Italy.
- June 2015, University of Tokyo Japan.
- May 2014, Rome II University, Italy.
- February 2013, IMA Minnesota, USA.

- March 2012, Aachen University, Germany.
- July 2011, Bath University, UK.
- June 2011, Rome I University, Italy.
- December 2010, Orsay, Paris, France.
- June 2010, Federico II University, Naples, Italy.
- July 2008, Bath University, Bath, England.
- April 2007, Max Planck Institute, Leipzig, Germany.
- March 2007, Applied math seminar, University of Athens, Greece.
- September 2005, Applied math seminar, University of Massachusetts, Amherst, USA.
- February 2004, Division of Applied Mathematics, Brown University, Providence, USA.
- September 2004, University of Notre Dame University, Indiana, USA.
- November 2003, University of Notre Dame, Indiana, USA.
- July 2003, Applied math seminar, University of Crete, Greece.
- January 2003, Applied math seminar, University of Toronto, Canada.
- December 2002, Istituto per le Applicazioni del Calcolo “Mauro Picone”, Rome, Italy
- July 2002, Roma II “Tor Vergata” University, Rome, Italy.
- October 2000, Brigham Young University, Provo, Utah, USA.

### **Publications in Journals**

(All papers are available online at [www.tem.uoc.gr/~gkarali/papersGK1](http://www.tem.uoc.gr/~gkarali/papersGK1))

- 30 Gradient dynamics: motion near a manifold of quasi-equilibria, with P.W. Bates and G. Fusco, *SIAM Journal on Applied Dynamical Systems*, 17, no 3, 2106-2145, (2018).
- 29 Malliavin Calculus for the stochastic Cahn-Hilliard/Allen-Cahn equation with unbounded noise diffusion, with D. Antonopoulou and D. Farazakis, *J. Differential Equations*, 265, 7, 3168-3211, (2018).
- 28 The sharp interface limit for the stochastic Cahn-Hilliard equation, with D. Antonopoulou and D. Blömker, *Annales Inst. Henri Poincaré Probab. and Stat.*, 54, no 1, 280-298, (2018).
- 27 Motion of a droplet for the stochastic mass-conserving Allen-Cahn equation, with D. Antonopoulou, D. Blömker and P.W. Bates, *SIAM J. Math. Anal.*, 48, no 1, 670-708, (2016).
- 26 Existence and regularity of solution for a Stochastic Cahn-Hilliard/Allen-Cahn equation with unbounded noise diffusion, with D. Antonopoulou and A. Millet, *J. Differential Equations*, 260, 2383-2417, (2016).
- 25 The ground state of a Gross-Pitaevskii energy with general potential in the Thomas-Fermi limit, with C. Sourdis, *Archive for Rational Mechanics and Analysis*, 217, no 2, 439-523, (2015).
- 24 Crank-Nicolson finite element discretizations for a 2d linear Schrodinger-type equation posed in a noncylindrical domain, with D. Antonopoulou, M. Plexousakis, and G. Zouraris, *Mathematics of Computation*, 84, no 294, 1571-1598, (2015).
- 23 A Hilbert expansion method for the rigorous sharp interface limit of the generalized Cahn-Hilliard equation, with D. Antonopoulou and E. Orlandi, *Interfaces and Free Boundaries*, 16, 65-104, (2014).
- 22 On the existence of solution for a Cahn-Hilliard/Allen-Cahn equation, with Y. Nagase, *Discrete Contin. Dyn. Syst.-Ser. S*, 7, no 1, 127-137, (2014).
- 21 A nonlinear partial differential equation for the volume preserving mean curvature flow, with D. Antonopoulou, *Networks and Heterogenous Media*, 8 no 1, 9-22, (2013).
- 20 Global-in-time behavior of the solution to a Gierer-Meinhardt system, with T. Suzuki and Y. Yamada, *Discrete Contin. Dyn. Syst.- Ser. A*, 33 no 7, 2885-2900, (2013).
- 19 Front motion in the one-dimensional stochastic Cahn-Hilliard equation, with D. Antonopoulou and D. Blömker, *SIAM J. Math. Anal.*, 44, 3242-3280, (2012).
- 18 Resonance phenomena in a singular perturbation problem in the case of exchange of stabilities, with C. Sourdis, *Communications in PDE*, 37, 1620-1667, (2012).

- 17 Radial and bifurcating non-radial solutions for a singular perturbation problem in the case of exchange of stabilities, with C. Sourdis, *Ann. Inst. H. Poincaré Anal. Non Linéaire*, 29, 131-170, (2012).
- 16 On the parabolic Stefan problem for Ostwald ripening with kinetic undercooling and inhomogeneous driving force, with D. Antonopoulou and A.N.K. Yip, *J. Differential Equations*, 252, 4679-4718, (2012).
- 15 Existence of solution for a generalized Stochastic Cahn-Hilliard Equation on convex domains, with D. Antonopoulou, *Discrete Contin. Dyn. Syst.- Ser. B*, 16 no 1, 31-55, (2011).
- 14 Asymptotics for a generalized Cahn-Hilliard equation with forcing terms, with D. Antonopoulou and G. Kossioris, *Discrete Contin. Dyn. Syst.- Ser. A*, 30, no 4, 1037-1054, (2011).
- 13 Stability of spheres under volume preserving mean curvature flow, with D. Antonopoulou, and I.M. Sigal, *Dynamics of PDE*, 7, no 4, 327-344, (2010).
- 12 On the convergence of a fourth order evolution equation to the Allen-Cahn equation, with T. Ricciardi, *Nonlinear Analysis TMA*, 72, no 11, 427-4281, (2010).
- 11 Nonlinear from Linear States in Two-Component Bose-Einstein Condensates, with P. Kevrekidis and N. Efremidis, *J. Phys. A: Math. Theor.*, 42 045206, (2009).
- 10 Bubble Interactions for the Mullins-Sekerka problem: Some Case Examples, with P. Kevrekidis, *Math. Comput. Simulations*, 80, 707-720, (2009).
- 9 Pulsating wave for mean curvature flow in inhomogeneous medium, with N. Dirr and N.K. Yip, *European Journal of Applied Mathematics*, 19, 661-699, (2008).
- 8 The role of multiple microscopic mechanisms in cluster interface evolution, with M. Katsoulakis, *J. Differential Equations*, 235, 418-438, (2007).
- 7 Singular limit of a spatially inhomogeneous Lotka-Volterra competition-diffusion system, with K. Nakashima, D. Hilhorst, and H. Matano, *Communications in PDE*, 32, 879-933, (2007).
- 6 Phase boundaries motion preserving the volume of each connected component, *Asymptotic Analysis*, 49, no 1, 17-37, (2006).
- 5 Thin-film equations with “partial wetting” energy: existence of weak solutions, with M. Bertsch and L. Giacomelli, *Physica D*, 209, 1-4, 17-27, (2005).
- 4 Ostwald Ripening in two dimensions - The rigorous derivation of the equations from the Mullins-Sekerka dynamics, with N. Alikakos and G. Fusco, *J. Differential Equations*, 205, no 1, 1-49, (2004).
- 3 Continuum limits of particles interacting via diffusion, with N. Alikakos and G. Fusco, *Abstr. Appl. Anal.*, no. 3, 215-237, (2004).
- 2 Motion of bubbles towards the boundary for the Cahn-Hilliard equation, with N. Alikakos and G. Fusco, *European Journal of Applied Mathematics*, 15 no 1, 103-124, (2004).
- 1 The effect of the geometry of the particle distribution in Ostwald Ripening, with N. Alikakos and G. Fusco, *Comm. Math. Phys.*, 238, 480-488, (2003).

### **Submitted**

- Formation of fine transitions layers and their dynamics for the stochastic Allen-Cahn equation, with D. Antonopoulou, M. Alfaro and H. Matano.