

## CURRICULUM VITÆ

### **Dimitrios K. Tsagkarogiannis**

Associate Professor, DISIM, University of L'Aquila

Email: dimitrios.tsagkarogiannis@univaq.it

Tel: +39 0862 433170

Nationality: Greek

Marital status: Married, two children

Languages: Greek, English, French, Italian, German

Codice Fiscale: TSGDTR76M18Z115Z

### **Studies**

PGCert Learning and Teaching in Higher Education, 11/12/2015, University of Sussex, UK.

Ph.D. in Mathematics, University of Massachusetts, Amherst, 1/09/2005.

Thesis title: "Mathematical strategies for the coarse-graining of interacting particle systems".

Thesis advisor: Markos Katsoulakis.

Diploma in Electrical and Computer Engineering, National Technical University of Athens, 15/07/1999.

Thesis title: "Recursive methods for the approximation of dynamical systems".

Thesis advisor: Ioannis Diamesis.

### **Academic positions**

Associate Professor, DISIM, University of L'Aquila, from 01/10/2020.

Associate Professor, DSFC, University of L'Aquila, 07/05/2019 - 30/09/2020.

Associate Professor, DISIM, University of L'Aquila, 01/10/2017 - 06/05/2019.

Senior Lecturer, Department of Mathematics, University of Sussex, 01/10/2016-30/09/2017.

Lecturer B, Department of Mathematics, University of Sussex, 01/09/2013 - 30/09/2016.

Assistant professor, Department of Applied Mathematics, University of Crete, 13/07/2012 - 01/10/2013. (Initially elected for this post on March 2009, but took service later due to state budget cuts.)

Post-doc, Hausdorff Center for Mathematics, University of Bonn, 01/09/2011 - 12/07/2012.

Marie Curie Researcher, (Ricercatore tempo determinato), Università degli Studi di Roma “Tor Vergata”, 18/11/2009 - 15/04/2011 and 15/10/2008 - 18/05/2009 (Military service: 18/05/2009 - 18/11/2009).

Post-doctoral associate: Max Planck Institute for Mathematics in the Sciences, Leipzig, 27/09/2005 - 30/09/2008.

Research assistant, University of Massachusetts (12/1/03 - 22/5/04 and 5/9/04 - 3/9/05).

Teaching associate, University of Massachusetts (1/9/02 - 11/1/03).

Teaching assistant, University of Massachusetts (3/9/00 - 26/5/01 and 2/9/01 - 25/5/02).

### **Research interests**

Probability and mathematical statistical mechanics: phase transitions, non-equilibrium systems, cluster expansions. Large Deviations and Scaling Limits for Interacting Particle Systems. Modelling and coarse-graining methods for stochastic systems.

### **Grants**

PI, Marie Curie Intra European Fellowships for career development, FP7-PEOPLE-2007-2-1-IEF. Title: “Phase Transitions: Modelling, Analysis and Simulations (PhaTraMAS)”. Total amount: 154 254,02 euro.

Co-PI, ARISTEIA II, GSRT, Greece, 2014 - 2015. Title: “Hierarchical Multi-

scale Modeling of Complex Materials”. Budget of the grant: 200.000 Euro.  
PI: Vagelis Harmandaris.

Participation in the project DFG, JA 2511/2-1 on “Renormalization for Gibbs point processes” per SPP 2265 “Random geometric systems”, coordinated by Prof. Dr. Sabine Jansen (Ludwig Maximilian University of Munich), from 01-09-2020.

PI, London Mathematical Society, 2015, “Scheme 4 grant”: research in pairs, £600.

PI, London Mathematical Society, Celebrating New Appointments - Scheme 1 grant, £595.

Co-PI, PRIN 2009TA2595, Italy, 2011. Title: “Dal microscopico al macroscopico: analisi di strutture complesse e applicazioni.” PI: Errico Presutti.

Marie Curie fellowship for graduate students, April-July 2004. Mathematics Institute, Warwick University, U.K.

### **Awards**

Marie Curie Intra European Fellowships for career development, FP7-PEOPLE-2007-2-1-IEF.

Outstanding graduate student award, College of Natural Sciences and Mathematics, University of Massachusetts, 2005.

Marie Curie fellowship for graduate students, April-July 2004. Mathematics Institute, Warwick University, U.K.

### **Invitations to Conferences as a speaker**

CECAM - Propagation of Uncertainty and Chaos in Multiscale Systems, Mainz, 3 March 2021.

“2019 Rouen Probability Meeting”, 23-27 September 2019

Stochastic and Analytic Methods in Mathematical Physics (XI International Conference of Mathematical Physics in Armenia), Yerevan, Armenia, Septem-

ber 2-7, 2019

Athens Probability Colloquium, University of Athens, 6 April 2019

Particle systems and PDE's VII, University of Palermo, 19-23 November 2018

Oberwolfach, 11-17 February 2018

Inhomogeneous Random Systems, IHP 23-24 January 2018

Numerical aspects of nonequilibrium dynamics, Institut Henri Poincaré, Paris, 25-27 April 2017.

Young Applied Analysts in the UK, 26-27 May 2016, University of Bath.

SIAM Conference on Mathematical Aspects of Materials Science, May 8-12, 2016, Philadelphia, PA, USA, mini symposium: Numerical Methods in Multiscale Materials Modelling.

Trends in Mathematical Crystallisation, 3-6 May 2016, University of Warwick.

Workshop on “Non-equilibrium Statistical Physics”, International Centre for Theoretical Sciences (ICTS), Bangalore, India, 26 October - 20 November, 2015.

Workshop on “Expansion methods in statistical mechanics: Successes, limitations, perspectives and alternatives”, University of Utrecht, 2 and 3 July, 2015.

Workshop on “Interacting Particles Systems and Non-equilibrium Dynamics”, Institut Henri Poincaré, Paris, 9-13 March 2015.

Intensive research week 2015: New perspectives in Analysis and Probability, 3 March 2015, University of Sussex.

Conference in Mathematical Physics, La Spezia, 1-5 September 2014.

37th Conference on Stochastic Processes and their Applications, Buenos Aires July 28 -August 1, 2014.

Young Applied Analysts in the UK, 29-30 May 2014, University of Glasgow.

From microscopic to continuum models in Materials Science, GSSI, L'Aquila,

March 31-April 4, 2014.

Calculus of Variations, Geometric Analysis and PDE's, University of Sussex, March 24-28, 2014.

EPSRC Symposium: Computational coarse-graining of many-body systems, University of Warwick, 9-13 December 2013.

Oberwolfach Mini-Workshop: Inelastic and Non-equilibrium Material Behavior: from Atomistic Structure to Macroscopic Constitutive Relations, 3 - 9 November 2013.

International Conference on Applied Mathematics, Heraklion, Crete, September 16-20, 2013.

Workshop on Stochastic Methods in Finance and Physics, July 15 - 19, 2013, Heraklion, Greece.

SIAM Conference on Mathematical Aspects of Materials Science, June 9-12, 2013, Philadelphia, PA, USA, mini symposium: "Micro-to-Macro Coarse-Graining and Effective Dynamics in Nonequilibrium Systems".

Stochastic and Analytic Methods in Mathematical Physics, Yerevan, Armenia, September 2-9, 2012.

EPSRC Symposium Workshop - Large Scale Behaviour of Random Spatial Models, 28 May - 2 June 2012, University of Warwick.

Workshop on "Coarse-graining of many-body systems: analysis, computations and applications" June 27 - July 1 2011, Heraklion Crete.

SIMAI 2010, Joint SIMAI/SEMA Conference on Applied and Industrial Mathematics, Cagliari, June 21-25, 2010

"Recent developments in Mathematical Physics", Università dell'Aquila, 11-12 February 2009.

Workshop on gradient models and elasticity, University of Warwick, 9-12 June 2008.

Numerical methods in molecular simulation, HIM, Bonn, 10-4-2008.

Workshop on Microscopic Origins of Dissipation and Noise, MPI Leipzig, Oct. 31 - Nov. 3, 2007.

Workshop on Mathematical and Computational Methods for Accelerated Molecular, Stochastic and Hybrid Simulation, FORTH, Heraklion, 25-27 June 2007.

### **Invited seminar talks**

Rhein-Main Kolloquium Stochastik, Darmstadt 31.01.20

Oberseminar Wahrscheinlichkeitstheorie, LMU, 27.01.20.

Mathematical Physics Seminar, Università di Roma TRE, 02-07-2019.

Newton Institute (program: “The mathematical design of new materials”), Cambridge 19-06-2019.

Department of Mathematics, University of Athens, 21 December 2015.

Statistical Mechanics seminar, Mathematics Institute, University of Warwick, U.K., 21-05-15.

Department of Mathematics, University of Athens, 26 January 2015.

Probability Seminar, University of Leiden, 4 December 2014.

Applied Mathematics and Mathematical Physics Seminar, Imperial College London, 20 November 2014.

MASS, University of Sussex, March 13 2014.

Mathematical Physics Seminar, Università di Roma TRE, 21-11-2013.

Department of Mathematics, University of Aquila, 23-01-13.

Hausdorff Research Institute for Mathematics, University of Bonn, 27-07-12.

Probability Seminar, Department of Mathematics, University of Pisa, 26-04-12.

Statistical Mechanics seminar, Mathematics Institute, University of Warwick, U.K., 19-01-12.

Oberseminar Analysis, Institute of Applied Mathematics, University of Bonn, 03-11-11.

Statistical Mechanics seminar, Mathematics Institute, University of Warwick, U.K., 03-03-11.

Applied and numerical analysis seminar, Department of Applied Mathematics, University of Crete, June 10, 2010

Department of Mathematics, Università di Roma “La Sapienza”, 08-03-10.

Mathematical Physics Seminar, Università di Roma TRE, 03-03-09.

AG Mikrostrukturen, MPI MIS, Leipzig, 15-07-08.

Applied Mathematics and Computation Seminar, University of Massachusetts, Amherst, Feb. 5, 2008.

Mathematics Seminar, University at Buffalo, SUNY, Jan. 31, 2008.

Statistical Mechanics seminar, Mathematics Institute, University of Warwick, U.K., Jan. 10, 2008.

Applied and numerical analysis seminar, Department of Applied Mathematics, University of Crete, Dec. 19, 2007

Seminar of the Institute of Applied Mathematics, University of Heidelberg, 24-07-2007.

Colloquium, Department of Mathematics, University of Athens, 14-06-2007.

Mathematics seminar, Charles University, Prague, 6-12-05.

Berlin-Leipzig Seminar, Analysis and Probability, MPI Leipzig, 25-11-05.

Statistical Mechanics seminar, MPI MIS Leipzig, 31-10-05.

### **Organization of conferences**

Co-organizer (with Roberto Fernandez and Sabine Jansen) of a Mini-Workshop “Cluster expansions: From Combinatorics to Analysis through Probability”, Oberwolfach, 5-11 February 2017.

Co-organizer (with Vagelis Harmandaris) of a workshop on “Mathematical and Computational Techniques for Molecular Systems”, 16-18 September 2015, University of Crete.

Co-organizer of “Intensive research week 2015: New perspectives in Analysis and Probability”, 2-6 March 2015, University of Sussex.

Co-organizer of “Conference on Partial Differential Equations”, 15-17 September 2014, University of Sussex.

Co-organizer of an “Intensive research week: Calculus of Variations, Geometric Analysis & PDEs”, Department of Mathematics, University of Sussex, 24 - 28 March 2014.

Co-organizer (with Alessandro Giuliani) of a mini-symposium on “Phase transitions” at the International Conference on Applied Mathematics, Heraklion, Crete on September 16-20, 2013.

Co-organizer (with Athanasios Tzavaras) of a Workshop on “Kinetic description of multiscale phenomena”, June 17-29, 2013, “Archimedes Center for Modeling, Analysis and Computation”, Department of Applied Mathematics, University of Crete.

### **Professional service**

Referee for SIAM J. Math. Anal., SIAM J. Appl. Math., J. Stat. Phys., Annals Appl. Prob., Brazilian J. of Prob. and Stat., Phys. Rev. E., SIAM MMS, Phys. Lett. A, Stoch. Proc. Appl., Comm. Math. Phys.

Member to the following PhD committees: Georgios Arampatzis (University of Crete), Luke Williams (University of Warwick), Roberto Boccagna (GSSI), Dang Thien Thu Nguyen (GSSI), Michele Aleandri (GSSI), Xuan Tong Nguyen (GSSI), (from 01-01-2014 to 03-07-2020).

Referee for the PhD thesis of Luke Williams, University of Warwick 01-12-2017 and for the M.Phil thesis of Jose Maria Moreno De Guerra Beato (University of Warwick), 06-03-2017.

External referee for State Scholarships Foundation Greece (IKY), from 2016.

### **Long term scientific visits**

Newton Institute, University of Cambridge (Program: The mathematical



design of new materials, 14-19 January 2019 and 16-26 June 2019)

Institut Henri Poincaré, (Program: Stochastic dynamics out of equilibrium, 11-21 June 2017)

International centre for theoretical sciences (ICTS), Bangalore, India, October 26 - November 7, 2015.

Gran Sasso Science Institute, L'Aquila, 16/10/2013 - 15/12/2013.

Hausdorff Institute of Mathematics, Bonn, 14/07/2012 - 20/08/2012. (Trimester Program: Mathematical challenges of materials science and condensed matter physics, HIM, Bonn, May 2 - August 31, 2012.)

ACMAC, University of Crete, 01/06/2011 - 15/07/2011.

### **Graduate students and postdoctoral supervision**

Member of the doctoral council “Mathematics and Models”, DISIM, University of L'Aquila, 2018-2021 (cycles XXXIV, XXXV, XXXVI, XXXVII).

Giuseppe Scola, PhD student, Gran Sasso Science Institute, L'Aquila, Cycle XXXIV, (defence date: 21/04/21).

Panagiota Birmpa, PhD student, University of Sussex, September 2014 - March 2018.

Dr Stephen Tate, Post Doc, University of Sussex, recipient of an LMS Post-doctoral Mobility grant, November 2014 - March 2015.

Dr Elena Pulvirenti, Post Doc, University of Crete, May-September 2013.

Co-advisor (together with Vagelis Harmandaris - principal advisor) of Anastasios Tsourtis (University of Crete), February 2017.

### **Teaching experience**

Fall 2020: Probability e Stochastic Processes, Laurea Magistrale in Matematica, Università dell'Aquila.

Spring 2018, 2019, 2020: Calcolo delle Probabilità A, Laurea in Matematica,

Università dell'Aquila.  
Spring 2018, 2019, 2020, 2021: Stochastic Processes, Laurea Magistrale in Ingegneria Matematica, Università dell'Aquila.  
Fall 2019: Matematica e biotecnologia, Università dell'Aquila.  
Spring 2019: Lectures on Cluster expansions and applications (6 hours), GSSI.  
Fall 2017: Introduction to Probability, University of Sussex.  
Spring 2016: Introduction to Statistical Mechanics, PhD course, University of Sussex.  
Spring 2015, 2016, 2017: Random processes (per studenti BSc and MSc), University of Sussex.  
Spring 2014, 2015, 2016, 2017: Numerical Analysis I, University of Sussex.  
Spring 2013: Probability, University of Crete.  
Fall 2012: Linear and non-linear programming/Optimisation Theory, University of Crete.  
Fall 2002: Calculus I (Math 131), University of Massachusetts.  
Spring 2002: Calculus II (Math 132), University of Massachusetts.  
Fall 2001: Calculus I (Math 131), University of Massachusetts.

### **Service at the University/department**

Member of various committees, evaluation of prospective MathMods students 2018-2019-2020, University of L'Aquila.

Director of Doctoral Studies for the Department of Mathematics at Sussex, 2016-2017.

Organiser of "Mathematics and Applications Sussex Seminar", since Spring 2014.

Organiser of the PhD courses at Sussex offered by the Taught Course Centre in Oxford for broadening training. Coordinated 30 students and 8 courses.

Preparation of the proposal to establish the new Probability group within the department of Mathematics at Sussex. This also coincides with the group research plan.

## Publications

### Articles in scientific journals

1. *Lagrange inversion and combinatorial species with uncountable color palette*, (with Sabine Jansen and Tobias Kuna), Ann. Henri Poincaré, 2021, <https://doi.org/10.1007/s00023-020-01013-0>.
2. *Cluster expansions with renormalized activities and applications to colloids*, (with Sabine Jansen), Ann. Henri Poincaré 2020, 21(1), pp. 45-79.
3. *Convergence of density expansions of correlation functions and the Ornstein-Zernike equation*, (with Tobias Kuna), Ann. Henri Poincaré 2018, 19(4), pp. 1115-1150.
4. *Parameterization of Coarse-Grained Molecular Interactions through Potential of Mean Force Calculations and Cluster Expansion Techniques* (with Anastasios Tsourtis and Vagelis Harmandaris), Entropy 2017, 19(8), 395.
5. *Action minimization and macroscopic interface motion under forced displacement*, (with Panagiota Birmpa), ESAIM: COCV 2017, 24(2), pp. 765-792.
6. *Large deviations for the macroscopic motion of an interface*, (with Panagiota Birmpa and Nicolas Dirr), J. Stat. Phys. (2017), 166 (5), pp. 1163-1192.
7. *Thermodynamics for spatially inhomogeneous magnetization and Young-Gibbs measures*, (with Alessandro Montino and Nahuel Soprano Loto), J. Stat. Phys. (2016), 164, 1318-1353.
8. *Finite volume corrections and decay of correlations in the canonical ensemble*, (with Elena Pulvirenti), 2015, J. Stat. Phys., Vol. 159, 5, 1017-1039.
9. *Exponential rate of convergence in current reservoirs*, (with Anna De Masi, Errico Presutti and Maria Eulalia Vares), 2015, Bernoulli 21(3), 1844-1854.
10. *Extinction time for a random walk in a random environment*, (with Anna De Masi, Errico Presutti and Maria Eulalia Vares), 2015, Bernoulli 21(3), 1824-1843.

11. *Multispecies Virial Expansions*, (with Sabine Jansen, Stephen Tate and Daniel Ueltschi), *Comm. Math. Phys.*, 330, 801-817 (2014).
12. *Coarse-graining schemes for stochastic lattice systems with short and long range interactions*, (with Markos Katsoulakis, Petr Plecháč and Luc Rey-Bellet), *Mathematics of Computation (AMS)*, 83 (2014), 1757-1793.
13. *Cluster expansion in the canonical ensemble*, (with Elena Pulvirenti), *Comm. Math. Phys.*, 2012, Vol. 316, Issue 2, pp 289-306.
14. *Non equilibrium stationary state for the symmetric simple exclusion with births and deaths*, (with Anna De Masi, Errico Presutti and Maria Eulalia Vares), *J. Stat. Phys.*, 147 (3) 2012, 519-528.
15. *Truncated correlations in the stirring process with births and deaths*, (with Anna De Masi, Errico Presutti and Maria Eulalia Vares), *Electron. J. Probab.* 17 (2012), no. 6, 1-35.
16. *Current Reservoirs in the simple exclusion process*, (with Anna De Masi, Errico Presutti and M. E. Vares), *J. Stat. Phys.*, 144 (6) 2011, 1151-1170.
17. *Fourier law, phase transitions and the stationary Stefan problem*, (with Anna De Masi and Errico Presutti), *Arch. Rat. Mech. Anal.*, Vol. 201, No. 2 (2011), 681–725.
18. *From mesoscale back to microscale: Reconstruction schemes for coarse-grained stochastic lattice systems*, (with José Trashorras), *SIAM J. Numer. Anal.*, Vol. 48, No. 5 (2010), pp. 1647-1677.
19. *Mathematical strategies and error quantification in coarse graining of extended systems*, (with Markos Katsoulakis, Petr Plecháč and Luc Rey-Bellet), *Jour. Non-Newtonian Fluid Mech.*, Vol. 152, 1-3, June 2008, pp. 101-112.
20. *Coarse-graining schemes and a posteriori error estimates for stochastic lattice systems*, (with Markos Katsoulakis, Petr Plecháč and Luc Rey-Bellet), *ESAIM: Math. Model. and Num. Analysis*, Vol. 41, No 3, 2007, pp. 627-660.
21. *Mesoscopic modeling for continuous spin lattice systems: model problems and micromagnetics applications*, (with Markos Katsoulakis and Petr Plecháč), *J. Stat. Phys.*, 119, 1-2 (2005), 347-389.

## Preprints

1. *Free energy expansions for renormalized systems for colloids*, (with Xuan Tong Nguyen and Giuseppe Scola).
2. *Virial inversion and density functionals*, (with Sabine Jansen and Tobias Kuna), preprint arXiv:1906.02322 [math-ph].

## Conference proceedings, with referees

1. *Mayer expansion for the Asakura-Oosawa model of colloid theory*, (with Sabine Jansen), Lectures in Pure and Applied Mathematics Verlag: Potsdam University Press. Vol.6. Proceedings of the XI international conference Stochastic and Analytic Methods in Mathematical Physics, pp. 127–134.
2. *Virial inversion for inhomogeneous systems*, (with Sabine Jansen and Tobias Kuna), Lectures in Pure and Applied Mathematics Verlag: Potsdam University Press. Vol.6. Proceedings of the XI international conference Stochastic and Analytic Methods in Mathematical Physics, pp. 135–144.
3. *On non-equilibrium fluctuations for the Stirring process with births and deaths*, (with Panagiota Birmpa and Patrícia Gonçalves), accepted for publication in Particle Systems and Partial Differential Equations VI, VII and VIII, ed. C. Bernardin, F. Golse, P. Gonçalves, V. Ricci and A. J. Soares Springer Proceedings in Mathematics and Statistics.
4. *Phase transitions and coarse graining for a system of particles in the continuum*, (with Elena Pulvirenti), 2016, P. Goncalves and A. J. Soares (eds.), From Particle Systems to Partial Differential Equations III, Springer proceedings in Mathematics and Statistics 162.
5. *A Tridiagonal canonical form for dynamical systems*, (with I. Diamesis), in proceedings of Conference on Information Sciences and Systems (CISS), Princeton, NJ, 2000.