Arghir Dani Zărnescu

Education

2006 **Ph.D. in Mathematics**
The University of Chicago, USA
Advisors: Peter Constantin and Lenya Ryzhik

2004 **M.Sc. in Mathematics**
The University of Chicago, USA

2002 **B.Sc. in Mathematics**
"Al.I. Cuza" University of Iasi, Romania

Employment

2016- Full Ikerbasque Research Professor,
at the Basque Center for Applied Mathematics (BCAM), Bilbao, Spain

2015- Senior Researcher,
"Simion Stoilow" Institute of Mathematics, Bucharest, Romania

2011-2016 Lecturer in Mathematics, University of Sussex, UK

2008-2011 Titchmarsh Research Fellow, University of Oxford, UK

2006-2008 Postdoctoral Research Assistant, University of Oxford, UK

Research Interests

Analytical questions related to the study of partial differential equations and their applications to physically relevant models.

Honours

2019 **"Nicolae Dinculeanu" Prize**
Romanian Academy, Romania
awarded at the 9th Congress of Romanian Mathematicians

2018 **"Simion Stoilow" Prize**
Romanian Academy, Romania

2008-2011 **Titchmarsh Research Fellow**
University of Oxford, UK

2008-2011 **N. Kurti Junior Research Fellow** (nonstipendiary)
Brasenose College, University of Oxford, UK

2002-2004 **C. Amick Fellow**
The University of Chicago, USA

Visiting Research Positions

- *Visiting Professor*, Hausdorff Institute, University of Bonn, Germany, 2023 during the Programme *Mathematics for Complex Materials*
- *Visiting Professor*, University of Toulouse, France, 2021
- *Research Fellow and Simons Foundation Fellow*, Newton Institute, Cambridge, UK, 2019 during the Programme *The Mathematical Design of New Materials*
- *Visiting Professor*, Fudan University, Shanghai, China, 2016
- *Research Fellow*, Newton Institute, Cambridge, UK, 2014 during the Programme *Free boundary problems and related topics*
- *Research Fellow*, Newton Institute, Cambridge, UK, 2013 during the Programme *Mathematics of Liquid Crystals*

Editorial Positions

- Editor of Advances in Nonlinear Analysis (2025-)

- Associate Editor of the SIAM Journal on Mathematical Analysis (2023-)

- Co-editor (with X. Chen, M. Ravnik and V. Slastikov) of the special issue on the Mathematical Design of Complex Materials, Phil. Trans. Roy. Soc. A 379 (2021)

Supervision of postdoctoral researchers

• Zhiyuan Geng (2020-2023)	BCAM (previously Courant Institute, afterwards Purdue U.)
• Xingyu Li (2022-2022)	BCAM (previously Ceramade, Université Paris Dauphine, currently U. di Trieste)
• Ashley Earls (2021-2022)	BCAM (previously U. of Akron, currently in industry)
• Arnab Roy (2021-2022)	BCAM (previously Czech Academcy of Sciences, currently tenure-track BCAM)
• Simone Rusconi (2021-2022)	BCAM (previously BCAM, currently CUNEF, Madrid)
• Panayotis Smyrnelis (2019-2022)	BCAM (previously U. of Chile, currently at U. of Athens)
• Jamie Taylor (2018-2022)	BCAM (previously U. of Oxford, currently CUNEF, Madrid)
• Giacomo Canevari (2017-2019)	BCAM (previously U. of Oxford, currently U. di Verona)
• Stefano Scrobogna (2017-2019)	BCAM (previously U. of Bordeaux, currently U. di Trieste)

Ph.D. Students supervised

- Sergio Moroni (2023-)
- Razvan Ceuca (2018-2022, BCAM and Iasi) in cotutelle with Eugen Varvaruca, Alexandru Ioan Cuza University of Iasi, now at Technical U. of Iasi, Romania
- Stuart Day (2013-2017, University of Sussex), now working in industry
- Mark Wilkinson (2009-2013, University of Oxford)-afterwards postdoc at Ecolé Normale Supérieure, Paris; Courant Institute, New York and Heriot-Watt, Edinburgh Currently at Nottingham Trent University, UK

Research funding:

- AEI-project PID2023-146764NB-I00 *"Multiscale Analytical PDE Studies in Fluid-Structure Interactions (MAPS-FSI) "* 2024-2028. Role: PI

- COST Action CA23134-*Topological textures in condensed matter* (2024-2028). Role: Grant Awarding Coordinator

- Severo Ochoa accreditation awarded to the Basque Center for Applied Mathematics, AEI, CEX2021-001142, 2023-2027. Role: Guarantor Researcher (one of ten)
- LTC-TRANSMATH 2023, Fundación Euskampus, 2023-2025, Role: researcher
- AEI-project PID2020-114189RB-I00 *"Liquid crystals and interactions" (LICI)* 2021-2025. Role: PI
- CNCS-UEFISCDI, project number PN-IV-P2-2.1-T-TE-2023-1704, (2025-2027) Role: researcher
- CNCS - UEFISCDI, project number PN-III-P4-PCE-2021-0921 (2022-2024). Role: researcher
- Basque Government-RC 2021-1-0011 grant to organize the SIAM MS21 online conference. Role: PI
- Spanish Ministry of Economy and Competitiveness MINECO-project MTM2017-82184- *"Designed fluids: ferrofluids and beyond" (DESFLU)* 2018-2021. Role: PI
- Severo Ochoa accreditation awarded to the Basque Center for Applied Mathematics SEV-2017-0718, 2018-2022. Role: Guarantor Researcher (one of ten)
- Severo Ochoa accreditation awarded to the Basque Center for Applied Mathematics SEV-2013-0323, 2014-2018. Role: Guarantor Researcher (one of ten)
- Leverhulme Trust Grant *"Liquid crystal defects in Landau-de Gennes Theory"* (with J. Robbins and V. Slastikov, University of Bristol), 2015-2018. Role: PI
- ModCompShock - *Modelling and Computation for Shocks and Interfaces*, EU ITN Network (within the Sussex node), 2015-2018. Role: researcher
- Research in Groups programme Centro Ennio de Giorgi, Pisa, Italy, France, full financial support for a group of four researchers for two weeks in July-August 2015. Role: co-organizer
- Research in Groups programme Institut Henri Poincare, Paris, France, full financial support for a group of four researchers for two weeks in July-August 2014. Role: co-organizer
- Research in Groups programme CIRM, Marseille, France, full financial support for a group of four researchers for two weeks in June-July 2014. Role: co-organizer
- Research in Groups programme Oberwolfach Institute, Germany, full financial support for a group of four researchers for two weeks in April 2014. Role: co-organizer
- Research in Groups programme "Mathematical problems in liquid crystals", fully supported financially by the Hausdorff Institute in Bonn (involving four researchers for three months during 2011 and 2012). Role: co-organizer
- Start-up grant awarded by the School of Mathematics and Physics, University of Sussex, 2011. Role: PI
- Financial support for a week-long meeting of four researchers in Oxford, during August 2010, granted by OxPDE Centre in Oxford. Role: PI

Major organisational responsibilities

- 2023 Co-organizer of the 3.5 month trimester programme *"Mathematics for Complex Materials"*
  70+long-term participants , (3 workshops, 1 Spring School)
- 2021 Co-chair of the *SIAM Conference on Mathematical Aspects of Materials Sciences MS2021*
  700+ participants
- 2019 Co-organizer of the 6-month programme *The Mathematical Design of New Materials*
  Isaac Newton Institute, Cambridge, UK
  100+ long-term participants,120+workshops participants
  (4 workshops, 2 Industry-Academia meetings, 1 Spring School)

Published articles

[60] *On the effect of a large cloud of rigid particles on the motion of an incompressible non-Newtonian fluid*,
(with E. Feireisl and A. Roy) J. Math. Fluid Mech. 27 (2025), no. 3, Paper No. 42, 18 pp

[59] *Boundary layers for the upper-convected Beris-Edwards model of nematic liquid crystals*,
(with F. De Anna and J. Kortum) Nonlinearity 38 (2025), no. 4, Paper No. 045012, 28 pp.

[58] *Colloidal homogenization for the hydrodynamics of nematic liquid crystals*,
(with F. De Anna and A. Schloemerkemper) Proceedings A 481 (2307), 20240192

[57] *The hydrostatic limit of the Beris-Edwards system in dimension two*,
(with X. Li and M. Paicu) Commun. Math. Sci. 22 (2024), no. 6, 1701-1732

[56] *Global existence of weak solutions for a model of nematic liquid crystal-colloidal interactions*
(with Z. Geng and A. Roy) SIAM J. Math. Anal. 56 (2024), no. 4, 4324-435

[55] *Entire Minimizers of Allen-Cahn Systems with Sub-Quadratic Potentials*
(with N. Alikakos and D. Gazoulis) J. Dynam. Differential Equations 36 (2024), S253-S285

[54] *Sufficient conditions for the existence of minimizing harmonic maps with axial symmetry in the small-average regime*
(with G. Di Fratta and V. Slastikov) Nonlinear Anal. Real World Appl. 78 (2024), Paper No. 104076

[53] *On the motion of a nearly incompressible viscous fluid containing a small rigid body*
(with E. Feireisl, A. Roy) J. Nonlinear Sci. 33 (2023), no. 5, Paper No. 94

[52] *On the motion of a small rigid body in a viscous compressible fluid*
(with E. Feireisl, A. Roy) Comm. Partial Differential Equations 48 (2023), no. 5, 794-818

[51] *On the motion of a large number of small rigid bodies in a viscous incompressible fluid*
(with E. Feireisl, A. Roy) J. Math. Pures Appl. (9) 175 (2023), 216-236

[50] *Reducing model complexity by means of the optimal scaling: population balance model for latex particles morphology formation*
(with S. Rusconi, C. Schenk, E. Akhmatskaya) Appl. Math. Comput. 443 (2023), Paper No. 127756,

[49] *Uniform profile near the point defect of Landau-de Gennes model*,
(with Z. Geng) Calc. Var. Partial Differential Equations 62 (2023), no. 1, Paper No. 3

[48] *Effective surface energies in nematic liquid crystals as homogenized rugosity effects*,
(with R. Ceuca and J. Taylor) Commun. Contemp. Math. 25 (2023), no. 6, Paper No. 2250020

[47] *Asymptotic behavior of the interface for entire vector minimizers in phase transitions* (with N. Alikakos and Z. Geng), J. Funct. Anal. 283 (2022), no. 6, Paper No. 109565

[46] *A phenomenological model for interfacial water near hydrophilic polymers* (with A. Earls, C. Calderer and M. Desroches), Journal of Phys. Cond. Mat. (2022), 34(35), 355102

[45] *Mathematical problems of nematic liquid crystals: between dynamical and stationary problems* Philos. Trans. Roy. Soc. A 379 (2021), no. 2201

[44] *Weak sequential stability for a nonlinear model of nematic electrolytes* (with E. Fereisl, E. Rocca and G. Schimperna), Discrete Contin. Dyn. Syst. Ser. S 14 (2021), no. 1, 219-241.

[43] *Symmetry and multiplicity of solutions in a two-dimensional Landau-de Gennes model for liquid crystals.*(with R. Ignat, L. Nguyen and V. Slastikov) Arch. Ration. Mech. Anal. 237 (2020), no. 3, 1421-1473

[42] *Polydispersity and surface energy strength in nematic colloids* (with G. Canevari), Math. Eng. 2 (2020), no. 2, 290-312

[41] *Landau-de Gennes corrections to the Oseen-Frank theory of nematic liquid crystals* (with G. di Fratta, J. Robbins and V. Slastikov) Arch. Ration. Mech. Anal. (2020) 236 (2), 1089-1125

[40] *Design of effective bulk potentials for nematic liquid crystals via colloidal homogenisation* (with G. Canevari) Mathematical Models and Methods in Applied Sciences, (2020) Vol. 30, n. 02, pp. 309-342

[39] *An optimal scaling to computationally tractable dimensionless models: Study of latex particles morphology formation* (with S. Ruscone, D. Dutykh, E. Ahkmatskaya), Computer Physics Communications, (2020) 247, p. 106944

[38] *On the uniqueness of minimisers of Ginzburg-Landau functionals* (with R. Ignat, L. Nguyen and V. Slastikov), Ann. Sci. Éc. Norm. Supér. 53 (2020), 589-613

[37] *On a sharp Poincaré-type inequality on the 2-sphere and its application in micromagnetics* (with G. di Fratta and V. Slastikov), SIAM Journal on Mathematical Analysis 51 (4), 3373-3387

[36] *Sphere-valued harmonic maps with surface energy and the K 13 problem* (with S. Day), Adv. Calc. Var. 12 (2019), no. 4, 363-392.

[35] *A scaling limit from the wave map to the heat flow into* $\mathbb{S}^2$ (with N. Jiang, Y.-L. Luo, S. Tang), Commun. Math. Sci. 17 (2019), no. 2, 353-375

[34] *Dynamics and Flow Effects in the Beris-Edwards System Modeling Nematic Liquid Crystals* (with X. Xu and H. Wu), Arch. Ration. Mech. Anal., 231 (2019), no 2, pp. 1217-1267

[33] *On a hyperbolic system arising in liquid crystals modeling* (with E. Fereisl, E. Rocca and G. Schimperna), J. of Hyperbolic Differential Equations, 15 (2018), no. 1, pp. 15-35

[32] *Shear flow dynamics in the Beris-Edwards model of nematic liquid crystals* (with A. Murza and A. Teruel) Proc. of Royal Society A, 474 (2018), no. 2210, pp. 20170673

[31] *Global well-posedness and twist-wave solutions for the inertial Qian-Sheng model of liquid crystals.* (with Francesco de Anna), J. Differential Equations 264 (2018), no. 2, 1080-1118.

[30] *Partial regularity and smooth topology-preserving approximations of rough domains.* (with J. Ball), Calc. Var. Partial Differential Equations 56 (2017), no. 1, Art. 13, 32 pp.

[29] *Liquid crystal defects in the Landau-de Gennes theory in two dimensions–Beyond the one-constant approximation.*
(with G. Kitavtsev, J. Robbins, and V. Slastikov), Mathematical Models and Methods in Applied Sciences, 26(14), 2769-2808. (2016)

[28] *Stability of point defects of degree* $\pm\frac{1}{2}$ *in a two-dimensional nematic liquid crystal model.* , (with R. Ignat, L. Nguyen and V. Slastikov) Calculus of Variations and Partial Differential Equations, 55(5), 119. (2016)

[27] *Uniqueness of Weak Solutions of the Full Coupled Navier-Stokes and Q-Tensor System in 2D*, (with F. de Anna), Commun. Math. Sci. 14 , no. 8, 2127-2178 (2016)

[26] *Instability of point defects in a two-dimensional nematic liquid crystal model*,
(with R. Ignat, L. Nguyen and V. Slastikov), Ann. Inst. H. Poincaré, vol. 33, No. 4, pp. 1131-1152 (2016)

[25] *Half-integer point defects in the Q-tensor theory of nematic liquid crystals.*,
(with G. di Fratta, J. Robbins and V. Slastikov), Journal of Nonlinear Science, 26(1), (2016) 121-140.

[24] *Dynamic Cubic Instability in a 2D Q-tensor Model for Liquid Crystals*,
(with G. Iyer and X.Xu), Math. Models Methods Appl. Sci. 25 (2015), no. 8, 1477-1517

[23] *Stability of the melting hedgehog in the Landau-de Gennes theory of nematic liquid crystals*,
(with R. Ignat, L. Nguyen and V. Slastikov), Arch. Ration. Mech. Anal., 215 (2015), no. 2, 633-673

[22] *Uniqueness results for an ODE related to a generalized Ginzburg-Landau model for liquid crystals*, (with R. Ignat, L. Nguyen and V. Slastikov), SIAM J. Math. Anal., 46 (2014), no. 5, 3390-3425

[21] *Nonisothermal nematic liquid crystal flows with the Ball-Majumdar free energy* ,
(with Eduard Feireisl, Elisabetta Rocca, Giulio Schimperna), Ann. Mat. Pura Appl. (4) 194 (2015), no. 5, 1269-1299.

[20] *Global existence for two extended Navier-Stokes systems*
(with M. Ignatova, G. Iyer, J. Kelliher, R.L. Pego), *Com. Math. Sci.*, 13 (2015), no. 1, 249-267

[19] *Dynamic Statistical Scaling in the Landau-de Gennes Theory of Nematic Liquid Crystals*
(with E. Kirr and M. Wilkinson), *J. Stat. Phys.*, 155, 4, (2014), 625-657

[18] *Evolution of non-isothermal Landau-de Gennes nematic liquid crystals flows with singular potential*, (with Eduard Feireisl, Elisabetta Rocca, Giulio Schimperna),
Com. Math. Sci., 12, 2, (2014), 317-343

[17] *Refined approximation for a class of Landau-de Gennes energy minimizers*,
(with L. Nguyen), *Calc. Var. Partial Differential Equations*, 47, 1 (2013), 383-432

[16] *Coercivity and stability results for an extended Navier-Stokes system*,
(with G.Iyer, R.L. Pego) *J. Math. Phys.* 53, (2012), 115605

[15] *Equivalence of weak formulations of the steady water wave equations*,
(with E. Varvaruca), *Phil. Trans. Royal Soc. London A*, 370 (2012), no. 1964, 1703-1719

[14] *Energy dissipation and regularity for a coupled Navier-Stokes and Q-tensor system*
(with M. Paicu), *Arch. Ration. Mech. Anal.*, 203 (2012), no. 1, 45-67

[13] *Orientability and energy minimization in liquid crystal models*
(with J. M. Ball), *Arch. Ration. Mech. Anal.*, 202 (2011), no.2, 493-535

[12] *Global existence and regularity for the full coupled Navier-Stokes and Q-tensor system*
(with M. Paicu), *SIAM J. Math. Anal.*, 43 (2011), no.5, 2009-2049

[11] *Landau-de Gennes theory of nematic liquid crystals: the Oseen-Frank limit and beyond*,
(with A. Majumdar), *Arch. Ration. Mech. Anal.*, 196 (2010), no.1, 227-280

[10] *Asymptotic stability of ground states in 2D nonlinear Schroedinger equation including subcritical cases*,
(with E. Kirr), *J. Differential Equations* 247 (2009), no. 3, 710–735

[9] *Orientable and non-orientable line field models for uniaxial nematic liquid crystals.*
(with J.M. Ball), *Molecular crystals and liquid crystals*, 495:573-585, (2008).

[8] *Regularity for coupled two-dimensional nonlinear Fokker-Planck and Navier-Stokes systems*,
(with P. Constantin, Ch. Fefferman, E. S. Titi), *Comm. Math. Phys.* 270 (2007), 3, 789-811

[7] *On the asymptotic stability of bound states in 2D cubic Schroedinger equation*,
(with E. Kirr), *Comm. Math. Phys.* 272 (2007), 2, 443-468

[6] *The 2D stationary Smoluchowski equation in strong homogeneous flow*,
Nonlinearity, 19 (2006), 1619-1628, Corrigendum 20 (2007), 2033

[5] *Existence results for some nonlinear implicit evolution equations.*
An. Stiint. Univ. Al. I. Cuza Iasi. Mat. (N.S.) 48, no. 2, 249–260 (2003)

Proceedings and short communications

[4] *Uniqueness of degree-one Ginzburg-Landau vortex in the unit ball in dimensions $N >= 7$,*

(with R. Ignat, L. Nguyen and V. Slastikov), Comptes Rendus Mathematiques, 356 (2018), no.9, pp. 922-926
[3] *Stability of the vortex defect in Landau - de Gennes theory of nematic liquid crystals* (with R. Ignat, L. Nguyen, V. Slastikov), *C.R. Acad. Sci. Paris, Ser. I 351 (2013) 533-537*
[2] *Orientable and non-orientable director fields for liquid crystals, (with J.M. Ball)*, *PAMM*, 7:1050701-1050704, 2007

Editorial Material

[1] *Topics in the mathematical design of materials*
with X. Chen, I. Fonseca, M. Ravnik, V. Slastikov and C. Zannoni, *Philos. Trans. Roy. Soc. A 379 (2021), no. 2201*

Organisational activity:

- Co-organizer (with X. Chen,M. Ravnik and V. Slastikov) of the workshop *Recent challenges in the mathematical design of new materials*, Newton Institute, Cambridge, UK, August 2025
- Co-organizer (with D. Golovaty and M. C. Calderer) of the minisymposium *Calculus of Variations Problems in Materials Science*, ECM, Sevilla, Spain, 2024
- Co-organizer (with D. Golovaty, M. C. Calderer, L. Bronsard and D. Beller) of the workshop *Mathematical Analysis of Soft Matter*, BIRS Center, Canada, July 2024
- Co-organizer (with X. Lamy) of the Spring School *Recent trends in the mathematics of complex materials*, Hausdorff Research Institute, Bonn, Germany, March 2023
- Co-organizer (with I. Fonseca and V. Slastikov) of the workshop *Current challenges in complex materials: modelling and analysis*, Hausdorff Research Institute, Bonn, Germany, January 2023
- Co-organizer (with G. diFratta, M.Ruggeri and V. Slastikov) of the workshop *New trends in the variational modeling and simulation of liquid crystals*, ESI Vienna, Austria, December 2019
- Co-organizer (with P. Zhang) of the Minisymposium *Emerging trends in liquid crystals encompassing modelling, simulation and analysis*, ICIAM, Valencia, Spain, July 2019
- Co-organizer (with G. Allaire, J. Ball, A. Garroni, F. Otto and V. Slastikov) of the workshop *New trends and challenges in the mathematics of optimal design*, Newton Institute, Cambridge, UK, June 2019
- Co-organizer (with X. Chen, M. Ravnik and V. Slastikov) of the *Spring school on the mathematical design of materials* Newton Institute, Cambridge, UK, March 2019
- Co-organizer (with S. Scrobogna) of the *Bilbao workshop on fluid dynamics*, Bilbao, Spain, February 2019
- Co-organizer (with X. Chen, M. Ravnik and V. Slastikov) of the workshop *Optimal design of complex materials*, Newton Institute, Cambridge, UK, January 2019
- Co-organizer (with P. Mironescu) of *Trimestre Analyse et EDP*, IMAR, Bucharest., Sep 2017-June 2018
- Co-organizer of the workshop *Transitions de phase et équations non locales*, IMAR, Bucharest, April 2018
- Co-organizer of the *Analysis and PDE seminar*, University of Sussex,

September 2013-May 2016

• Co-organizer of the *Minisymposium on Mathematical Analysis of Liquid Crystals*, SIAM conference on Analysis of Partial Differential Equations, December 2015, Arizona, USA.

• Co-organizer of the workshop
"Recent trends in classical and complex fluids", University of Sussex, September 2013

• Co-organizer of the contributed mini-symposium
"Advances in liquid crystals", ICIAM, Vancouver, 2011

• Co-organizer of the international workshop
"Recent developments in the analysis and modelling of liquid crystals", Oxford, March 2010

• Co-organizer of *OxPDE lunchtime seminar*, University of Oxford, 2008-2010

• Co-organizer of the international workshop
"Recent developments in the analysis and modelling of liquid crystals", Oxford, March 2010

Invited Workshop and Mini-Symposium Talks

- "Mathematics of fluids in motion: Recent results and trends", CIRM Workshop, Marseille, France, November 2024
- Scottish-Basque Meeting on Analysis, Maxwell Institute, U. of Edinburgh, Edinburgh, UK, October 2024
- "AMAED Fest'24", U. de Cantabria, Santander, Spain, September 2024
- Trends and perspectives in the analysis of PDEs", Roma, Italy, September 2024,
- Nonlinear PDEs, calculus of variations and applications, U. of Sussex, Brighton, UK, June 2024
- RSME Congress, minisimposium "New Trends and Perspectives in Fluid Dynamics", Pamplona, Spain, January 2024
- "Topological and geometrical aspects in complex materials" Workshop, Hausdorff Institute, Bonn, March 2023
- 10th Congress of Romanian Mathematicians, Pitesti, July 2023
- SIAM Conference on Nonlinear Waves, Bremen, Germany, September 2022
- International Conference on Nonlinear Analysis and Nonlinear PDEs (online), Xi'an, China, August 2022
- Workshop "Analysis of Nematic Liquid Crystal Flows", Marseille, France, April 2022
- Symposium on "Elliptic and parabolic equations on topics arising from models in materials science" at AMS Western Virtual Sectional Meeting, October 2021
- Workshop "Mathematical Models in Engineering and Sciences", Naples, Italy, September 2019
- Third Romanian-Turkish Mathematics Colloquim, Constanta, Romania, September 2019
- Symposium on "Spirals, wrinkles, and vortices: Singularities in the nonlinear equations of materials science", Valencia, Spain, July 2019

- Symposium on "Mathematical and Computational Aspects of Materials Science" at the MRS Spring Meeting, Phoenix, Arizona, USA, April 2019
- Jornada Cantabria de EDPs, Castro Urdiales, Spain, September 2018
- M3ST 2018 Conference, Kalamata, Greece, September 2018
- Conference in honour of Sir John Ball's 70th anniversary, Oxford, UK, May 2018
- Mathematical Congress of the America, Montreal, Canda, July 2017
- Conference on Elliptic and Parabolic problems, Gaeta, Italy, May 2017
- Workshop on Phase Transition Models, Banff, Canada, May 2017
- Symposium on Trends in Application of Mathematics to Mechanics (STAMM), INdAM-ISIMM workshop, Rome, Italy, September 2016
- Colloque Franco-Roumain en Mathematiques Appliques, Iasi, Romania, August 2016
- "Modeling materials and fluids using variational methods", Berlin, Germany, February 2016
- One-day meeting in PDEs, Pavia, Italy, February 2016
- North-East Ohio Applied Mathematics Workshop, Kent, Ohio, USA, January 2016
- Partial Order: Mathematics, Simulations and Applications, IPAM, Los Angeles, USA, January 2016
- NYU-Oxford Workshop on Mathematical Models of Defects and Patterns, Courant Institute, New-York, USA, January 2016
- Mathematics and Mechanics in the 22nd Century: Seven Decades and Counting... , Eugene, OR, USA, October 2015
- Mathematical Aspects of Hydrodynamics, Oberwolfach, Germany, August 2015
- The 8th Congress of Romanian Mathematicians, Iasi, Romania, June 2015
- Indam-ERC Workshop "Special materials in complex systems", INDAM, Rome, Italy, May 2015.
- 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Madrid, July 2014
- International Conference on the Mathematical Theory of Liquid Crystals and related topics, Shanghai, China, June 2014
- Workshop on computational coarse graining of many body systems, Warwick, December 2013
- "Diffuse Interface Models", CIRM Workshop, Levico Treme, Italy, September 2013
- Recent advances in partial differential equations and applications, Milan, Italy, June 2013
- The Ginzburg-Landau Model and Related Topics, SIAM Conference on Mathematical Aspects of Material Sciences, Philadelphia, USA, June 2013
- Nonlinear analysis of continuum theories: statics and dynamics, Oxford, UK, April 2013

- Symmetry, bifurcation and order parameters, Isaac Newton Institute, Cambridge, UK, January 2013
- The Many Aspects of Fluids and Harmonic Analysis, SIAM Conference on PDEs, San Diego, USA, November 2011
- Mathematical Analysis on the hydrodynamic flow of liquid crystals and related complex fluids, SIAM Conference on PDEs, San Diego, USA, November 2011
- Liquid Crystal Modelling and Display Applications Workshop, Oxford, UK, August 2011
- Dissipative PDEs in Bounded and Unbounded Domains and Related Attractors, Edinburgh, UK, September 2010
- SIAM Conference on Emerging Topics in Dynamical Systems and Partial Differential Equations, Barcelona, Spain, June 2010
- Journée Cristaux Liquides, Orsay, Paris, France, February 2009
- SIAM Conference on Analysis of PDEs, Phoenix, USA, December 2007
- International Congress of Industrial and Applied Mathematics, ICIAM07, Zurich, Switzerland, July 2007
- British Applied Mathematics Colloquium, BAMC, Bristol, UK, April 2007

Invited seminar talks

- Fluid Conversations Seminar, Institute of Mathematics of Sevilla, November 2023
- Applied Analysis Seminar (online), Louisiana State University, Applied Analysis Seminar, November 2022
- Analysis and PDE Seminar (online), The Chinese University of Hong Kong, May 2022
- Séminaire Modélisation, Analyse et Calcul, University of Toulouse, France, December 2021
- Departmental Colloquium (online), Old Dominion University, USA, November 2020
- PDE Seminar, Oxford University, Oxford, UK, October 2016
- PDE Seminar, Chinese Academy of Sciences, Beijing, China, June 2016
- Materials Science Seminar, Peking University, Beijing, China, June 2016
- PDE Seminar, Peking University, Beijing, China, June 2016
- BCAM Scientific Seminar, Bilbao, Spain, February 2016
- Joint PDE and Dynamical System Seminar, University of Surrey, October 2015
- PDE Seminar, Centro De Giorgi, Italy, August 2015
- Analysis Seminar, Heriot-Watt University, UK, January 2015
- Monthly Lecture, “Simion Stoilow” Institute, Romania, January 2015
- PDE Seminar, Fudan University, Shanghai, China, June 2014

- Newton Institute, The Mathematics of Liquid Crystals programme, 2 talks, March 2013
- Cardiff Analysis Seminar, Cardiff, UK, February 2013
- OxPDE Luncthime Seminar, Oxford, UK, November 2012
- London Analysis Seminar, London, UK, January 2012
- PDE Seminar, Milan, Italy, November 2011
- Applied Mathematics Seminar, Pavia, Italy, November 2011
- Departmental Seminar, Reading, UK, November 2011
- Séminaire-equations aux dérivées partielles et applications, Université Lyon I, Lyon, France, June 2011
- Mathematics Colloquim, ETH Zurich, Switzerland, April 2011
- CNA Seminar, Carnegie Mellon, Pittsburgh, USA, March 2011
- HADES Seminar, University of Illinois at Urbana-Champaign, USA, March 2011
- Calderon-Zygmund Seminar, University of Chicago, USA, March 2011
- CAMP/ PDE Seminar, University of Chicago, USA, March 2011
- Séminaire-equations aux dérivées partielles et applications, Institut de Mathématiques de Bordeaux , France, February 2011
- Applied Mathematics Seminar, University of Southampton, UK, January 2011
- Applied Mathematics Seminar, University College, London, UK, October 2010
- PDE Seminar Series, Bath, UK, October 2010
- Seminar on partial differential equations, Prague, Czech Republic, October 2010
- Analysis Seminar, Edinburgh, UK, November 2009
- Analysis seminar, University of Illinois at Urbana-Champaign, USA, March 2009
- Séminaire Analyse et Probabilités, Paris-Dauphine, France, March 2009
- Séminaire-equations aux dérivées partielles et applications, Collège de France, Paris, France March 2009
- Groupe de travail-equations aux dérivées partielles, Paris 6, France, February 2009
- Departmental Seminar, Swansea, UK, January 2009
- Analysis Seminar, Bristol, UK, December 2008
- Applied Mathematics Seminar, Bonn, Germany, April 2008
- Séminaire: Modélisation Mathématique et Calcul Scientifique, Lyon, France, March 2008
- Seminar in Pure and Applied Mathematics, Sussex, UK, January 2008
- Applied Mathematics Seminar, Minneapolis, USA, December 2007

- Oberseminar Analysis, Leipzig, Germany, October 2007
- PDE Seminar, Bath, UK, April 2007
- Nonlinear Mathematics Seminar, Surrey, UK, March 2007
- Applied Analysis and Mechanics Seminar, Oxford, UK, October 2006

Invited Mini-Courses

- *Old and new in homogenisation, with applications to liquid crystals* ,
  9th Regional School on Applied Mathematics, Sinaia, Romania, July 2024
- *Design of nematic liquid crystals through colloidal homogenization*,
  Spring School "Mathematical Advances for Complex Materials with Microstructures" ,
  Würzburg, Germany, April 2024
- *Homogenisation in liquid crystals*
  University of Toulouse, France, December 2021
- *Scales and scalings in nematic liquid crystals and beyond*
  University of Verona, Italy, online, November 2020
- *Introduction aux Mathématiques des cristaux liquides*,
  Ecole d'été rgionale franco-roumaine en mathématiques appliques, Sinaia, July 2017
- *A brief introduction into the Q-tensor theory of liquid crystals*
  University of Athens, Greece, January 2017
- *Liquid crystal hydrodynamics: between Leslie-Ericksen and De Gennes*
  Kacov, Czech Republic, May 2015
- *Mathematical Problems of the Q-tensor theory*
  Academy of Sciences of the Czech Republic, Prague, October 2010

Invited Monograph Contribution

"Topics in the Q-tensor theory of liquid crystals", pp. 187-266,
Topics in mathematical modelling and analysis, vol 7
Lecture Notes of Jindrich Necas Center for Mathematical Modeling,
Prague, Czech Republic

Referee for:

Anal. Institut H. Poincare, Arch. Rational Mech. Anal., Calc. Var PDE,
Comm. Math. Phys., Comm. PDE, Comm. Pure and App. Anal., DCDS-A,
J. of Diff. Eqs., J. of Math. Phys, Nonlinearity, Nonlinear Anal., Physica D,
Proc. Roy. Soc. London Ser. A, Proc. Roy. Soc. Edinburgh, Trans. AMS

Grant reviewer for:

NSERC (Canada), DEVA AAC (Spain), EPSRC (UK), RGC (Hong Kong),
UEFISCDI (Romania), NSC (Poland), Reprise (Italy)

Teaching

2014-2016	**Lecturer** University of Sussex Mathematical Fluid Mechanics
2012-2014	**Lecturer** University of Sussex Harmonic Analysis and Wavelets

2012-2016 **Lecturer** University of Sussex
Introduction to Pure Mathematics

2011-2012 **Lecturer** University of Sussex
Numerical Analysis for ODE
Complex Analysis

2011-2013 **Academic Advisor** University of Sussex
Academic advisor for 24 undergraduate students

2011 **Lecturer** University of Oxford
Graduate course on "Mathematical problems of the Q-tensor theory"
Mentor University of Oxford
Research Program for Undergraduates

2008–2010 **Tutor** University of Oxford
Solid Mechanics, Functional Analysis

2004–2006 **Lecturer in the College** University of Chicago
Mathematics 15100, 15200, 15300-Medium level Calculus

2003, 2006 **Mentor** University of Chicago
Research Experience for Undergraduates

2003–2004 **College Fellow** (teaching assistant) in Mathematics, University of Chicago
Mathematics 16100, 16200, 16300-Honors Calculus

Service

- Member of the SIAM Materials Science Chapter nomination committee 2022
- Member of the executive committee of SEMA (Sociedad Española de Matemática Aplicada) (2019-2022)
- Responsible for the scientific management of the Ph.D. programme in the Basque Center for Applied Mathematics, BCAM, (2016-2022)
- Member of the UPV Doctoral School Committee (2020-2022)
- Member of the BCAM Management Committe (2022-)
- Member of the BCAM Course Committee (2022-)
- Member of the European Mathematical Society Raising Public Awareness Committee (2023-)
- Member of the selection committee of the Ikerbasque candidates supported by BCAM, (2016-)
- Misconduct officer, University of Sussex, 2012-2016

Professional Affiliations

American Mathematical Society
Society for Industrial and Applied Mathematics
RSME (Real Sociedad Matemática Española)
SEMA (Sociedad Española de Matemática Aplicada)
EMS (European Mathematical Society)