Institution: University of Chester
Unit of Assessment: B10 Mathematical Sciences
1. Unit context and structure, research and impact strategy

1.1 Context

Research in Mathematical Sciences is undertaken by the Mathematics Research Group, led by FORD, formed from staff from the Department of Mathematical & Physical Sciences and other associated staff from the Faculty of Science and Engineering at the University of Chester. Research in the Faculty is based at Thornton Science Park, the former Shell Research facility, a unique location serving as a platform for the interaction of academia (students of Mathematics and academic staff) with industry and commerce. The Science Park (part of the Cheshire Science Corridor) hosts around 40 companies working in the strategic areas of Energy, Automotive, Environment, and Advanced Manufacturing, providing project and employment opportunities for students and collaborations in research. In 2021 there are plans to relocate some of the department's activities to the Exton Park site in close proximity to researchers in medical science and biosciences. This will facilitate even closer research interactions in future with those areas.

The University of Chester Corporate Plan makes an explicit commitment to supporting an expanding and innovative University research environment that ensures high quality research and innovative practices that help influence the development and improvement of society. The University Research Strategy has identified Mathematics research as one of the University's areas of strength and has committed to support and invest in the work of the Group. The Group's activities link to all four of the University's core themes for research, with particular focus on applications to Health and Wellbeing and Local Economy. The future strategy of the Mathematical Sciences Unit of Assessment (UoA) is fully aligned with the University's research and impact plans for the next five years. The performance of the Unit during this REF period is strong, meeting objectives set in REF2014:

- To continue to focus on numerical and analytical solution of functional differential equations;
- To extend links with applications areas through continued collaboration (inter alia) with Freed and Bocharov;
- To continue to co-operate with long-term collaborative partners in Lisbon, Vila Real, Braunschweig, Stockholm and to develop new partnerships;
- To develop new collaborations through the Science and Engineering Faculty and Thornton Science Park;
- To extend capability through new staff appointments;
- To develop expertise in rheology, materials modelling and robotics.

1.2 Structure

Leadership of the Mathematical and Physical Sciences Department, where the UoA is set, has been provided by the Head of Department Jason Roberts, advised by the Faculty and University Committees. Leadership of the Research Group is provided by Prof Neville Ford (Director of the Mathematical Sciences Research Group and (currently) Pro-Vice Chancellor (Research and Innovation)). There is a strong synergy between teaching and research: students benefit from a curriculum that is enhanced by links to our research and this strengthens progression to postgraduate study and research careers.

In REF2021, we are submitting 7 staff (headcount) to UoA 10, the same number as were submitted in REF2014. One person submitted in 2014 has moved to another UoA in REF2021, and two have retired. We have significantly increased the number of women staff through 3 new appointments since REF2014 and we are submitting an additional existing member of staff who has returned to research from other academic responsibilities during this REF period.

Specifically, and aligned with our strategy, we have made the following important additions to our staff base:

Antonopoulou (appointed as Senior Lecturer, promoted to Associate Professor in 2019) from the University of Crete. She had created in Greece, and then developed in UK, an extended network of international collaborations with researchers from Greece (Crete), Canada (Toronto), USA (Purdue, Michigan), Germany (Augsburg, Tuebingen, Bielefeld), France (Paris) and Japan (Tokyo, Waseda), in Stochastic PDEs and Stochastic Analysis (mathematical areas where UK has a leading role in the global research landscape). Since her arrival at the University of Chester, she has received a prestigious Prize from the Academy of Athens, Greece for her work in Analysis (December 2016), and she was externally funded by a Conferences - Scheme 1, LMS Grant (Research Grants of London Mathematical Society) in 2019, for the organisation of the international Workshop held at the University of Chester entitled 'Recent Trends in Stochastic Analysis and Partial Differential Equations', with the participation of world-leading mathematicians in the area from Bath, Edinburgh, Imperial College London, Toronto, Purdue, Bordeaux, Crete and Augsburg. Antonopoulou has also established effective collaborations with Kavallaris, Roberts and Yan within the Chester group.

Karakatsani (appointed as Lecturer, promoted to Senior Lecturer in 2019) from Strathclyde University. Karakatsani organised an LMS-sponsored workshop in 2015 entitled: ‘A posteriori error control and mesh adaptivity for time dependent and nonlinear problems’. Karakatsani and Antonopoulou were amongst the speakers. Karakatsani organised a minisymposium at MAFELAP Conference, (Brunel, June 2016) on ‘Adaptive methods and singular solutions of nonlinear problems’ and was invited to participate in the Hausdorff Trimester Program ‘Multiscale Problems: Algorithms, Numerical Analysis and Computation’ organised by specialists in the field of Applied and Computational Mathematics (Bonn, Germany, April 2017). Karakatsani also collaborated with Barrenechea from Strathclyde, and Burman from UCL in February 2015.

Taylor (appointed in 2020, formerly PhD student within the group) strengthens our commitment to work on Algebra, Number Theory and applications to Coding. Her primary interests are group rings and their applications to coding theory. She has established a stronger connection between group rings and self-dual codes, proving that a group ring element corresponds to a self-dual code if and only if it is a unitary unit. She continues to research new techniques for constructing self-dual codes.

For many years the main research focus of the Mathematics Research Group was the analytical and numerical analysis of deterministic and stochastic functional differential equations. This submission represents growth and broadening of our research into several inter-related and overlapping research themes, in line with the plans presented in REF2014. The submission consists of all 7 members of the Mathematics academic staff of the Department on the census date: 1 Professor; 4 Associate Professors; 2 Senior Lecturers. The Group has been further augmented through the recent appointment of Taylor.

In addition to the members of the Group submitted to Mathematical Sciences in REF2021 (Antonopoulou, Ford, Gildea, Karakatsani, Kavallaris, Roberts, Yan), reference will also be made to the work of the late CTH Baker (former member of the Group), Taylor (recently appointed ECR and former PhD student within our Group), and Mc Auley & Wilkinson (submitted to other REF2021 Units), who are also members and collaborators with the Group, with interests in modelling in medical science and biosciences).

The research of the Group is organised within the following overlapping themes:

- Algebra, Number Theory and applications of Group Algebras to Coding Theory: Gildea, Taylor.
- Analysis, Applied Analysis and Numerical Analysis: Ford, Antonopoulou, Roberts, Kavallaris, Karakatsani, Yan, (Baker).
- Mathematical Modelling: Ford, Antonopoulou, Roberts, Kavallaris, (Baker, Mc Auley, Wilkinson).
- Stochastic Analysis: Antonopoulou, Yan, Kavallaris, (Baker).

1.3 Research and Impact Strategy

In Mathematical Sciences, our strategy is to pursue world class and internationally excellent research that leads to outcomes that will have impact on other researchers and disciplines and (where possible) have wider economic and societal benefits. We seek to achieve this through the appointment of excellent researchers to our academic staff, who are encouraged to collaborate with others (both within academia and beyond) and to undertake leading-edge research in Chester. Our strategy today has developed directly from the vision we gave in REF2014 and it articulates especially with the University strategy core themes through our work on modelling in the biomedical sciences (Health and Wellbeing theme) and our work on applications in materials science and engineering (Local Economy theme). These are the areas where we anticipate to grow further our impact plans.

We have continued to work on numerical and analytical solution of functional differential equations (outputs by Ford, Roberts, Yan, Baker). Aligned with our overall strategy, we have extended our capability and have developed high quality research expertise in analysis and numerical treatment of partial differential equations and stochastic PDE problems (outputs by Antonopoulou, Karakatsani, Kavallaris). We have also developed effective numerical methods for fractional partial differential equations (outputs by Yan, Ford).

Our modelling activities have built on our previous work with Bocharov and Freed: we have developed further work in immunology through working with Immunosys and Immundnz, the immune response company based at Alderley Park in the Cheshire Science Corridor, which led (for example) to an invited plenary lecture (by Ford) at IWANASP 2015. We have developed interests in research related to mathematical modelling of ageing (outputs by Roberts, Kavallaris, Mc Auley), DNA methylation, and cholesterol metabolism. In addition, we have developed expertise in materials science through working with L.L. Ferras (Minho) and his co-workers on problems in polymer sciences (outputs by Ford).

We have built further on our collaborations, which have always been a strong feature of the Chester department: we now have ongoing collaborations with colleagues from Minho, as well as those existing collaborations with colleagues from a wide range of Universities worldwide and featuring all members of the research group. Full details are provided in Section 4.

The development of the Science, Engineering and Technology faculty and the Science Park has provided opportunity for further interdisciplinary co-working with colleagues from Chemical Engineering, Electrical and Electronic Engineering and Chemistry (for example, in co-authored outputs and co-supervised doctoral students with Mc Auley).

Application of the results of research undertaken by the Mathematics Research Group has always been at the heart of the Group's activities and has formed the basis for our Impact strategy. The Group has a strong interest in modelling. Recognising that mathematics research usually has an indirect, rather than direct impact, there has therefore been a considerable focus on engaging with scientists from areas which themselves interact directly with users. Some of these interactions take place with colleagues and companies based on Thornton Science Park and many others (such as those with Immunosys and Immundnz) with other local and regional organisations. These interactions and insights have driven the areas of research activity and helped prioritise impactful research questions for the Group's work as well as expanding the capacity of a small group to conduct high quality research with impact. Both impact case studies submitted build on the emphasis on interdisciplinary work, with strong partnerships with applied researchers, and provide evidence for the success of this strategy.

The fundamental approach of the Mathematics Research Group is to interact early with people who already understand the application area. The aim is to ensure that the needs of the application area are translated through this collaboration into clear and achievable mathematical objectives and research questions. Having formulated the research questions, the strategy is to work on the mathematical project but keep the lines of communication with users open to test new insights

against reality. The final stage in the process is to communicate and disseminate results, both in the mathematical literature and translated into a form that will be useful to the users. A feedback mechanism is then employed by listening continuously to the users to see how they interpret and use the results. This feedback mechanism provides one basis for subsequent mathematical objective-setting.

The effective application of this approach can be evidenced, for example, through the work undertaken as part of a project with Immundnz and a consultancy project for Barcanet. Our collaborations with Diethelm (FHWS, formerly at GNS, Braunschweig), Bocharov (INMRAS), and Ferras (Minho) also link directly to these aims.

Mathematical modelling techniques are used by scientists working on ageing and cancer to predict problems in DNA strains, predict cell movements in a cancerous environment, and capture possible cancerous cell behaviour, aligning with our strategic theme of Health and Wellbeing. Alongside this vital medical impact, mathematical modelling research on the thermal behaviour of perovskite solar cells is world-leading and provides an important contribution to the green-energy sector, as well as input into energy-based government policy.

Further impact is anticipated through increased public engagement/outreach and continued focus on sharing high quality research with other researchers and disciplines via presentations, conferences and publications, leading to increased citation and adoption of our cutting-edge mathematical techniques as a substantive base for future applied research. We have embraced Open Access publication as a core goal for all our outputs since 2014, with the Institutional Repository (ChesterRep) being a source for all our work, and we are actively working towards adopting Open Data standards, in line with the University's strategy. This contributes to ensuring our research activities meet the highest standards of research integrity and that research results are reproducible. Where appropriate, research proposals involving human or animal subjects are considered by the Science and Engineering Faculty Ethics Committee.

1.4 Future Strategic Aims and Goals

In line with the University's overall Research Strategy, the Mathematical Sciences research group will continue to develop internationally excellent and world-leading research. Our work will link to the University's core themes of Health and Wellbeing and Local Economy, through the areas of application, and the impact partners we have and continue to establish. We will seek to grow further work with applications to Sustainability and Environment.

Our strategic research goals are:

In Algebra, Number Theory and applications to Coding:

- through collaboration with members of the Computer Science Group, to continue with our work on crypto systems and secret sharing, and its ongoing impact on the field of Computer Science. (Gildea, Taylor)

In Analysis, Applied Analysis and Numerical Analysis:

- to continue to work on functional differential equations and (especially) fractional differential equations including fractional PDEs and to develop high order reliable numerical methods. (Ford, Yan)

- to interact with the Electrical Engineering Group, on nonlinear control models from Energy Systems (nonlinear systems of ODEs where a global stability mathematical analysis is essential for the development of the existing applications implemented so far for linear models). This work furthers our ongoing impact on the green-energy sector, aligns with the University's Environment and Sustainability strategic core theme, and continues our important contribution to energy-based government policy. (Antonopoulou, Kavallaris)

- to continue to develop our expertise in Finite Elements (Antonopoulou, Yan, Karakatsani) to support joint research with the Electrical Engineering Group in the Faculty.

- to continue to develop our expertise in the mathematical analysis of non-local models (involving non-local diffusion) arising in MEMS industry and Evolutional Game Theory (Kavallaris).

In Mathematical Modelling:

- to continue to work on mathematical immunology and modelling of viral spread, drug therapies and the ageing process, and to build further links and collaborations with colleagues from biology, medicine, health and social sciences, aligning to the Health and Wellbeing strand of the Research Strategy. (Ford, Mc Auley)

- to develop further our modelling work relating to problems in materials science, control and engineering through collaborations with colleagues from the physical and engineering sciences. (Ford)

In Stochastic Analysis:

- to work with the materials science group on Stochastic PDEs arising from phase separation of alloys (Antonopoulou, Kavallaris, Yan)

Each of these research themes is led by an oversight group which has responsibility for overseeing the research plan and managing the effective dissemination, outreach and impact of the work. Our existing approach to impact, involving early interaction with users of the research, is core to the approach.

2. People

2.1 Staffing strategy and staff development

Our staffing strategy focuses on all academic staff in Mathematical Sciences having a core area of research that links with our research themes, as described above. All existing members of the team have strong research backgrounds, with a record of internationally excellent and world-leading research. Where vacancies arise, we aim to recruit excellent researchers whose work is complementary to our existing team and who will continue to broaden and strengthen our core themes. We also aim to attract promising ECRs, postdoctoral researchers and Master/PhD students of high scientific potential.

5 permanent staff submitted to REF2014 are still in post; from the current submission, 5 out of 7 have been promoted during the REF period: 4 are now Associate Professors (Antonopoulou, Kavallaris, Roberts, Yan), and 1 Senior Lecturer (Karakatsani). Changes during the REF period have been as a result of retirement and expansion.

As part of their development, PhD students and Research Master students are encouraged, with appropriate training and support, to contribute to teaching, tutorials and computer laboratory sessions. This has been a successful strategy in helping their career development and enabling their transition to academic posts in Chester and elsewhere (see below).

There is a monthly record of research outcomes collected by the Head of Department (HoD) and reported at Faculty level. This ensures that progress is monitored independently and that resources can be made available to any activities requiring further support.

The HoD (Roberts) arranges an annual individual Performance and Development Planning (PDP) meeting where teaching, research, journal/book publications, impact and funding received is discussed with staff. PDP meetings support feedback and useful interaction on teaching, research, promotions and funding from the University, Research Councils and charities.

As part of our focus on developing our staff and students, the Mathematical Sciences Research Group supports research visitors and staff research visits and travels. The Group has hosted significant collaborators, such as: Akrivis (Ioannina, Greece), B. Jin (UCL), Barrenechea (Strathclyde), Bloemker (Augsburg, Germany), Cangiani (Nottingham), Chanpin Li (Shanghai,

China), Corfe (Sheffield), Dedner (Warwick), Dougherty (Scranton, USA), Kamvissis (Crete, Greece), Karali (Crete, Greece), A. Kaya (Jakarta, Indonesia), Lacey (Heriot Watt), Matzavinos (Brown, USA), Pani (Mumbai, India), Prohl (Tuebingen, Germany), Salcedo-Sora (Liverpool), Shardlow (Bath), I.M. Sigal (Toronto, Canada), Suzuki (Osaka, Japan), Tylyshchak (Uzhgorod, Ukraine), Waterson (Ulster), Winkler (Paderborn, Germany), Xue-Mei Li (Imperial), Yildiz (Toronto, USA), Yip (Purdue, USA), Zhou (Hong Kong), and Zimmer (Bath).

Research visits of staff for collaboration were supported to various Universities and Research Institutions of significant and world-leading research activity such as: Ford at Brno, Ghent and Braunschweig, Kavallaris at Brown, KAUST, Osaka, BRICS, ESGI, Universita di Napoli Federico II, Paderborn and Bielefeld, Karakatsani at Maryland, Warwick, Hausdorff Research Institute for Mathematics, Ioannina, Crete, Sussex, Strathclyde and IACM-FORTH, Yan at UCL, Shanghai and Zhou Zhi, Mc Auley at Ulster, and Antonopoulou at Bielefeld, Augsburg, Heraklion, Athens, York and IACM-FORTH, Roberts at Ghent.

Early Career Researchers are supported in several ways: Each ECR has a mentor to guide them during their first few years to ensure that they make sound progress in establishing themselves as independent researchers. The workload model takes account of the need to prepare new material for teaching (for example) so that research time is not prejudiced. As a consequence, ECRs normally teach on fewer courses than more experienced colleagues. The Department ensures an allocation of research funding to support ECR travel and visitors to aid developing collaborations.

2.2 Training and supervision of PGR students

During the current REF period, the Mathematical Sciences Group admitted 4 PT MPhil/PhD, 5 FT MPhil/PhD and 2 MRes students. The PGR programme is run through the participation of all staff in teaching and skill development as well as supervision of dissertations.

Significant expertise is transferred through lectures, tutorials and laboratories by the highly experienced members of staff, in all areas of the UoA's research; we also aim to develop students' employability skills useful for careers in academia and industry. Our Research Seminar, and the weekly PGR Seminar, are addressed to PhD students. We regularly provide year-long weekly seminar series (organised by Yan and Antonopoulou): for example, on the theme "Numerical Methods for Stochastic PDEs", during 2015-16, and "Fractional Brownian Stochastic Processes", during 2018-19. Further departmental seminars have been provided on "Generation of Interfaces for the Stochastic Allen-Cahn equation", "Existence and Regularity for the Stochastic Cahn-Hilliard/Allen-Cahn Equation", "A Posteriori Error Analysis of Time-Dependent Problems" and "Finite-Time Blow-Up of Parabolic Stochastic PDEs." PGR students who undertake teaching duties are supported to attend 'New To Teaching' workshops run by the mathematics community nationally as well as specific training organised in Chester. PGR students nearing completion of studies have also been supported to attend early career events run by professional bodies.

Members of permanent academic staff in the UoA normally have at least one PhD student and several master-level students under their supervision. PGR supervision is provided through supervisory teams of at least two supervisors to ensure that students are supported in their research by advice from more than one viewpoint, and also to ensure continuity of supervision in the event of staff changes or absence. PGR student representatives participate in Staff/Student Committee meetings where matters relating to supervision, facilities and support can be discussed.

During the current REF period, the University has invested to provide three fully funded PhD Scholarships in Mathematics, in addition to those funded from other sources. Where students aspire to a career in academia, fixed-term hourly contracts for lectures, tutorials and laboratory sessions are offered and these have helped PGR students move into academic employment on completion of their studies (Taylor, Malique, Zagkos, Pal and Rowntree). Malique is now an Assistant Professor at Hfar Al Batin, Zagkos is a Research Associate in the Department of Life Sciences, Brunel, Pal is a lecturer at United Arab Emirates University, Khan is attending PGCE training, Taylor is a lecturer at Chester and Rowntree is a Research Associate at the School of Medical Sciences at Manchester. Widening access to PhD study is enhanced by the part-time route, which has proved attractive to

returners to study, mature students (including those with caring and family responsibilities) and to those who wish to work part time to support their study as well as those with certain disabilities (in the REF period, 46% of part-time PGR students were female, and 42% were known to be disabled). Students following this route have been extremely successful in completing their studies and gaining employment in Universities and research positions elsewhere and this alternative route has also been successful in expanding the diversity of our PGR population.

Collaboration with UTAD

Through a memorandum of co-operation with UTAD in Vila Real, Portugal, which is not currently able to award its own PhD degrees in Mathematics, and supported by the Erasmus exchange programme, students may be co-supervised by recognised and trained colleagues from UTAD alongside experienced Chester supervisors on PhD programmes leading to examination and award of a Chester PhD qualification. This has led to further co-operation with UTAD and also led directly to the joint work with Ferras (Minho) who is a former PhD student on this programme.

2.3 Support for equality and diversity

The Mathematical Sciences Unit promotes equality and diversity, with a support strategy aligned with the University's Athena SWAN Bronze award and the HR Excellence in Research award as well as the Navajo Merseyside and Cheshire LGBTI Charter Mark and the Disability Confident Employer scheme. Three permanent staff members of the Unit (Antonopoulou, Karakatsani, Taylor) are female mathematicians, and Antonopoulou is a member of European Women in Mathematics. The University of Chester has always had a significant number of female students in Mathematics, which is also reflected in our postgraduate population. We also draw attention to the impact of our part time doctoral programme on widening participation and supporting a diverse student population.

The University's REF code of practice has been followed to identify staff and outputs. All eligible academic staff have been included in the Mathematical Sciences REF2021 submission. Selection of outputs has been primarily based on self-assessment of quality by their authors. To enable statistically significant monitoring against equality and diversity objectives, the data for Mathematical Sciences is combined for analysis with other cognate units.

Current staff from the EU and overseas (5/8) continue to draw international students to the university's Mathematics Department. Multi-faith spaces, quiet rooms and quiet gardens are available at Thornton and Exton Park, as are gender-neutral toilets and parent-and-baby rooms. Thornton additionally has a specific quiet room designed for students with Aspergers/Autism. For disabled staff and students, there are reserved parking spaces near to the entrances of most buildings, as well as lifts and touch-activated doors, for example. The Facilities Team works with staff and students to address any specific access issues encountered. There is also a wheelchair accessible minibus that operates a shuttle service between Thornton and Exton Park. Mathematics staff and students, together with those across the wider university, are supported by the Equality Forum, Disabled Staff Group, Neurodiverse Student and Staff Support Group, Women's Network, LGBT+ Staff Group, Parents' Network and Carers' Network. The annual Diversity Festival, which is also open to members of the public, provides a focus through which the University actively promotes, challenges and develops an understanding of equality, diversity and multiculturalism. The proximity to industry facilitates research opportunities for disabled people and other underrepresented groups.

3. Income, infrastructure and facilities

3.1 Mathematical Sciences income

The University of Chester continues to invest 100% of the research income it receives in support of research. This enables a travel fund to be available for every member of the Mathematical Sciences Group annually to support conference attendance and academic visits and visitors to enable collaboration. Much of our work is of relatively low cost, and therefore the existing support mechanisms are frequently able to support fully the development plans, which are carefully monitored to ensure equality and diversity issues are addressed.

In addition to these income sources, we can highlight the following grants and contracts:

2013/14
RCUK £2,203
Leverhulme Trust £6,883
EPSRC £2,144

2014/15
EPSRC £800

2016-2017
Karakatsani: London Mathematical Society **£1,296.00**

2017-2018
Roberts: Mathematics Modelling Decision Making in Immunology Immunosys Ltd, Direct Negotiation/Quotation, Contract Research **£12,500.00** (which led to an Impact Case Study)

2018-2019
Gildea: 14 Day collaborative research with Uzhgorod National University, Ukraine, London Mathematical Society, Grant Basic Research **£1,618.00**

2019-2020
Antonopoulou: Mathematics, Recent Trends in Stochastic Analysis and Partial differential Equations, London Mathematical Society, Grant Basic Research **£5,599.00**

Roberts: Development of data-driven models for measuring corporate and civic success - barcanet.com **£1707.00**

3.2 Infrastructure and facilities pertaining to research and research impact

The Mathematical Sciences Unit, housed at Thornton and Parkgate Campuses, has access to the University's high-speed internet connection, free Wi-Fi, Virtual Learning Environment, integrative AV and whiteboards, as well as the many drop-in PC and Mac suites. There is also an excellent specialist mathematics collection, including journals and e-resources, in the Sutton library at Thornton Campus.

The main specialist resource available is the University's high-performance computing cluster, consisting of a combined processor power of 312 cores based on Intel Xeon E5 series @ 2.5GHz CPUs with up to 530GB of memory. Cores are divided amongst 17 computer nodes linked via high-speed infiniband interconnects. This is used by our research group for work involving parallel algorithm development, including a recent PhD thesis by Nicola Banks, supervised by Ford.

Thornton Science Park is part of the Cheshire Science Corridor, which includes Alderley Park, where one of our collaborators (Immunosys/Immundz) is based.

4. Collaboration and contribution to the research base, economy and society

4.1 Research Collaborations, networks and partnerships

Antonopoulou

- University of Crete: collaboration with Karali on problems on phase transitions and stochastic interface motion, resulting in outputs e.g. Antonopoulou, D.C., Karali, G.D., Plexousakis, M. & Zouraris, G.E. (2014). Crank-Nicolson finite element discretizations for a two-dimensional linear Schroedinger-type equation posed in noncylindrical domain. Mathematics of Computation, 84 (294), 1571-1598. 10.1090/S0025-5718-2014-02900-1 and Antonopoulou, D.C. Farazakis, D. Karali, G.D. (2018). Malliavin Calculus for the stochastic Cahn-Hilliard/Allen-Cahn equation with unbounded noise diffusion, Journal of Differential Equations, 265(7), 3168—3211

10.1016/j.jde.2018.05.004. Collaboration with Kamvissis on problems from wave propagation with solitons e.g. Antonopoulou, D.C. & Kamvissis, S. (2015). On the Dirichlet to Neumann Problem for the 1-dimensional Cubic NLS Equation on the half-line. Nonlinearity, 28(9), 3073-3099. 10.1088/0951-7715/28/9/3073

- University of Augsburg: collaboration with Bloemker on stochastic dynamics in phase transitions e.g. Antonopoulou, D., Bloemker, D. & Karali, G. (2018). The sharp interface limit for the stochastic Cahn-Hilliard Equation. Annales de l'Institut Henri Poincaré Probabilités et Statistiques, 54(1), 280-298. 10.1214/16-AIHP804

- Joint work has also resulted from collaborations with Plexousakis (Crete), Millet (Paris) and Bates (Michigan) e.g. Antonopoulou, D.C., Plexousakis, M. (2019). A posteriori analysis for space-time, discontinuous in time Galerkin approximations for parabolic equations in a variable domain, ESAIM: M2AN, 53(2), 523—549 10.1051/m2an/2018059 and Antonopoulou, D.C., Bates, P.W., Blömker, D., Karali, G.D. (2016). Motion of a droplet for the Stochastic mass conserving Allen-Cahn equation, SIAM J. Math. Anal., 48-1, 670—708 10.1137/151005105. Collaborations with Yip (Purdue), Matano (Meiki Tokyo), Prohl (Tuebingen) and Banas (Bielefeld) have been established.

Ford

- Luliang University collaboration on numerical schemes for fractional differential equations: Li, Z., Yan, Y., & Ford, N.J. (2016). Error estimates of a high order numerical method for solving linear fractional differential equations. Applied Numerical Mathematics, 114, 201-220. 10.1016/j.apnum.2016.04.010; Yang, Y., Yan, Y., & Ford, N. (2017). Some time stepping methods for fractional diffusion problems with nonsmooth data. Computational Methods in Applied Mathematics, 18(1), 129-146, 10.1515/cmam-2017-0037.

- Universidade Nova de Lisboa collaboration on distributed order equations: Ford, N.J., Morgado, M.L., & Rebelo, M.S. (2015). An implicit finite difference approximation for the solution of the diffusion equation with distributed order in time. Electronic Transactions on Numerical Analysis, 44, 289-305.

- University of Minho collaboration on fractional differential equations in materials modelling: Ferrás, L., Ford, N., Morgado, M., Rebelo, M.S., & Nobrega, J.M. (2015). Fractional Pennes' bioheat equation: Theoretical and numerical studies. Fractional Calculus and Applied Analysis, 18(4), 1080-1106, 10.1515/fca-2015-0062; Ferrás, L.L., Ford, N.J., Morgado, M.L., Rebelo, M., McKinley, G.H. & Nóbrega, J.M. (2018). Theoretical and numerical analysis of unsteady fractional viscoelastic flows in simple geometries. Computers and Fluids, 174, 14-33, 10.1016/j.compfluid.2018.07.004.

- Instituto Superior Tecnico, Lisbon collaboration on modelling of biomedical systems: Ford, N.J., Lima, P.M., & Lumb, P.M. (2017) Numerical investigation of noise induced changes to the solution behaviour of the discrete FitzHugh–Nagumo equation. Applied Mathematics and Computation, 293, 448-460, 10.1016/j.amc.2016.08.035; Lima, P.M., Ford, N.J., Lumb, P.M. (2014). Computational methods for a mathematical model of propagation of nerve impulses in myelinated axons, Applied Numerical Mathematics 85, 38-53, 10.1016/j.apnum.2014.06.004.

- University of Aveiro collaboration on fractional calculus: Ford, N.J., Moayyed, H. & Rodrigues, M.M. (2018) Orthogonality for a class of generalised Jacobi polynomial $P^{\alpha,\beta}_{\nu}(x)$. Fractional Differential Calculus, 8(1), 95-110, 10.7153/fdc-2018-08-06.

- GNS & TU-BS, Braunschweig collaboration on fractional calculus: Diethelm, F. & Ford, N.J. (2018). A note on the well-posedness of terminal value problems for fractional differential equations. Journal of Integral Equations Applications, 30(3), 371-376, 10.1216/JIE-2018-30-3-371.

- University of Manchester collaboration to complete the final research paper by C T H Baker following his death: Baker, C.T.H., Ford, N.J. (2020). Characteristic functions of differential equations with deviating arguments, Applied Numerical Mathematics 149, 10.1016/j.apnum.2019.04.010.

- Institute of Numerical Mathematics, Russian Academy of Sciences collaboration on transient problems: Ford, N.J., Savostyanov, D.V., Zamarashkin, N.L. (2014). On the decay of the elements of inverse triangular Toeplitz matrices, SIAM Journal on Matrix Analysis and Applications, 35(4), 1288-1302, 10.1137/130931734.

- Universidade de Tras-os-Montes e Alto Douro (UTAD) collaboration on fractional boundary value problems: Ford, N., Morgado, M., Rebelo, M. (2015). A nonpolynomial collocation method for fractional terminal value problems, Journal of Computational and Applied Mathematics 275, pp. 392-402 10.1016/j.cam.2014.06.013.

Gildea

- Established a network in 2016 with Yildiz (Northern Arizona, USA), Dougherty (Scranton, USA), Kaya (Sampoerna, Indonesia), Tylyshchak (Uzhgorod, Ukraine). Resulting outputs include: Dougherty, S.T., Gildea, J., Korban, A., Kaya, A., Tylyshchak, A., & Yildiz, B. (2019). Bordered constructions of self-dual codes from group rings and new extremal binary self-dual codes. Finite Fields and their Applications 57, 108-127, 10.1016/j.ffa.2019.02.004; Gildea, J., & Tylyshchak, A. (2016). Torsion units in the integral group ring of PSL(3, 4). Journal of Algebra and Its Applications, 15(01), 1650013, 10.1142/S0219498816500134; Bondarenko, V.M., Gildea, J., Tylyshchak, A.A., & Yurchenko, N.V. (2019). On hereditary reducibility of 2-monomial matrices over commutative rings. Algebra and Discrete Mathematics, 27(1); Dougherty, S., Gildea, J., & Kaya, A. (2019). Quadruple Bordered Constructions of Self-Dual Codes from Group Rings, Cryptography and Communications, 1-20, 10.1007/s12095-019-00380-8; Gildea, J., Kaya, A., Taylor, R., & Yildiz, B. (2018). Constructions for Self-Dual Codes Induced from Group Rings, Finite Fields and Their Applications, 51, 71-92, 10.1016/j.ffa.2018.01.002; Dougherty, S.T., Gildea, J., Kaya, A., & Yildiz, B. (2019). New self-dual and formally self-dual codes from group ring constructions. Advances in Mathematics of Communications, 14(1), 11-22; Gildea, J., Kaya, A. & Yildiz, B. (2019). An Altered Four Circulant Construction for Self-Dual Codes from Group Rings and New Extremal Binary Self-dual Codes I. Discrete Mathematics, 342(12), 111620, 10.1016/j.disc.2019.111620.

- Manchester Metropolitan University: Gildea, J. & O'Brien, K. (2016). Torsion units for some untwisted exceptional groups of lie type. Acta Sci. Math. (Szeged), 82, (3-4), 451-466. doi: 10.14232/actasm-015-048-6

Taylor

- Is a member of Gildea's network and has collaborated on outputs e.g. Dougherty, S., Gildea, J., Taylor, R., & Tylyschak, A. (2018). Group Rings, G-Codes and Constructions of Self-Dual and Formally Self-Dual Codes. Designs, Codes and Cryptography, 86(9), 2115-2138, 10.1007/s10623-017-0440-7; Gildea, J., Kaya, A., Taylor, R., & Yildiz, B. (2018). Constructions for Self-Dual Codes Induced from Group Rings, Finite Fields and Their Applications, 51, 71-92, 10.1016/j.ffa.2018.01.002; Gildea, J., Abidin, K., Taylor, R. & Tylyshchak, A. (2020). Double Bordered Constructions of Self-Dual Codes from Group Rings over Frobenius Rings. Cryptography and Communications, 1–16.

Karakatsani

- Collaboration with Barrenechea (University of Strathclyde) and Burman (University College London) resulting in outputs e.g. Barrenechea, G.R., Burman, E., Karakatsani, F. (2017). Blending low-order stabilised finite element methods: a positivity preserving local projection method for the convection-diffusion equation. Computer Methods in Applied Mechanics and Engineering, 317, 1169-1193. 10.1016/j.cma.2017.01.2016; Barrenechea, G., Burman, E. &

Karakatsani, F. (2016). Edge-based nonlinear diffusion for finite element approximations of convection–diffusion equations and its relation to algebraic flux-correction schemes. Numerische Mathematik, 135(2), 521-545, 10.1007/s00211-016-0808-z.

- University of Crete, Foundation for Research and Technology (Greece) and University of Sussex: Bänsch, E., Karakatsani, F., & Makridakis, C.G. (2018). A posteriori error estimates for fully discrete schemes for the time dependent Stokes problem. Calcolo, 55, 19, 10.1007/s10092-018-0259-2.

Kavallaris

- Technical University of Dresden: work on cancer modelling and a project describing cell decision-making processes, resulting in the output Barua, A., Syga, S., Mascheroni, P., Kavallaris, N., Meyer-Hermann, M., Deutsch, A., & Hatzikirou, H. (2020). Entropy-driven cell-decision making predicts fluid-to-solid transition in multicellular systems. New Journal of Physics, 22, 123034, 10.1088/1367-2630/abcb2e.

- Brown University: using Bayesian techniques to study DNA methylation in mammals, the first such approach in the field of DNA methylation - Larson, K., Zagkos, L., Mc Auley, M., Roberts, J., Kavallaris, N. I., & Matzavinos, A. (2019). Data-driven selection and parameter estimation for DNA methylation mathematical models. Journal of theoretical biology, 467, 87-99, 10.1016/j.jtbi.2019.01.012.

- Paderborn University: building a mathematical model to describe the replicator dynamics approach in Evolutionary Game Theory - Kavallaris, N.I., Lankeit, J., & Winkler, M. (2017). On a degenerate non-local parabolic problem describing infinite dimensional replicator dynamics. SIAM Journal on Mathematical Analysis, 49(2), 954-983, 10.1137/15M1053840.

- Osaka University: collaboration with Suzuki resulting in outputs Kavallaris, N.I., & Suzuki, T. (2015). An analytic approach to the normalized Ricci flow-like equation: Revisited. Applied Mathematics Letters, 44, 30-33, 10.1016/j.aml.2014.12.009; Kavallaris, N.I., & Suzuki, T. (2017). Non-Local Partial Differential Equations for Engineering and Biology Mathematical Modeling and Analysis. Springer; Kavallaris, N.I., & Suzuki, T. (2017). On the dynamics of a non-local parabolic equation arising from the Gierer-Meinhardt system. Nonlinearity, 30(5), 1734-1761, 10.1088/1361-6544/aa64b2.

- Heriot-Watt University, University of Aegean and National Technical University of Athens: Kavallaris, N., Lacey, A., Nikolopoulos, C., Tzanetis, D., On the quenching of a nonlocal parabolic problem arising in electrostatic MEMS control. Nonlinear Analysis, Discrete and Continuous Dynamical Systems - Series A, 2015, 35(3), 1009-1037.

- Universita` di Napoli Federico II: Kavallaris, N.I., Ricciardi, T., & Zecca, G. (2018). A multi-species chemotaxis system: Lyapunov functionals, duality, critical mass. European Journal of Applied Mathematics, 29(3), 515-542. 10.1017/S0956792517000286.

- University of Sussex: Kavallaris, N., Bareira, R., & Madzvamuse, A. (2020). Dynamics of shadow system of a singular Gierer-Meinhardt system on an evolving domain. Journal of Nonlinear Science, 31(5). 10.1007/s00332-020-09664-3.

Mc Auley

- Brown University: Larson, K., Zagkos, L., Mc Auley, M., Roberts, J., Kavallaris, N.I., & Matzavinos, A. (2019). Data-driven selection and parameter estimation for DNA methylation mathematical models. Journal of theoretical biology, 467, 87-99, 10.1016/j.jtbi.2019.01.012.

- Edge Hill University: Collaboration with Mooney, e.g. Mc Auley, M.T., Mooney, K.M., Angell, P.J., & Wilkinson, S.J. (2015). Mathematical modelling of metabolic regulation in aging. Metabolites, 5(2), 232-251, 10.3390/metabo5020232.

- Liverpool Hope University: Collaboration with Enrique Salcedo-Sora, e.g. Salcedo-Sora, J., & Mc Auley, M.T. (2016). A mathematical model of microbial folate biosynthesis and utilisation: implications for antifolate development. Molecular BioSystems, 12(3), 923-933, 10.1039/C5MB00801H.

- Newcastle University: Mc Auley, M.T., et. al. (2017). Modelling the molecular mechanisms of ageing. Bioscience reports, 37(1), 10.1042/BSR20160177.

- University of Sheffield: Kilner, J., Corfe, B.M., McAuley, M.T., & Wilkinson, S.J. (2016). A deterministic oscillatory model of microtubule growth and shrinkage for differential actions of short chain fatty acids. Molecular BioSystems, 12(1), 93-101, 10.1039/c5mb00211g.

Roberts

- Brown University: Larson, K., Zagkos, L., Mc Auley, M., Roberts, J., Kavallaris, N.I., & Matzavinos, A. (2019). Data-driven selection and parameter estimation for DNA methylation mathematical models. Journal of theoretical biology, 467, 87-99, 10.1016/j.jtbi.2019.01.012.

- Luliang University: Collaboration with Liu Yanzhi e.g. Yanzhi, L., Roberts, J., & Yan, Y. (2018). Detailed error analysis for a fractional Adams method with graded meshes. Numerical Algorithms, 78(4), 1195-1216, 10.1007/s11075-017-0419-5; Yanzhi, L., Roberts, J., & Yan, Y. (2018).

- King Abdul Aziz University (Saudi Arabia): Roberts, J.A., & Joharjee, N.G. (2016). Stability analysis of a continuous model of mutualism with delay dynamics. International Mathematical Forum, 11(10), 463-473, 10.12988/imf.2016.616.

- University of Princess Nourah bint Abdulrahman (Saudi Arabia): Roberts, J.A., & Themairi, A.A. (2017). Introducing delay dynamics to Bertalanffy's spherical tumour growth model. Applied Numerical Mathematics, 114, 154-164, 10.1016/j.apnum.2016.10.009.

- Russian Academy of Sciences: Roberts, J.A., Savostyanov, D.V., Tyrtyshnikov, E.E. (2014). Superfast solution of linear convolutional Volterra equations using QTT approximation, Journal of Computational and Applied Mathematics 260, 434-448, 10.1016/j.cam.2013.10.025.

Yan

- Luliang University: Collaboration with Li Zhiqiang, Xing Yanyuan, Wang Yanyong, Liu Yanmei, Liu Yanzhi, Yan Yang, Fan Lili e.g., Li, Z., Yan, Y. Error estimates of high-order numerical methods for solving time fractional partial differential equations, Fractional Calculus and Applied Analysis, 3(2018) 746-774, 10.1515/fca-2018-0039; Xing, Y., & Yan, Y. (2018). A higher order numerical method for time fractional partial differential equations with nonsmooth data. Journal of Computational Physics, 357, 305-323, 10.1016/j.jcp.2017.12.035; Wang, Y., Yan, Y. & Hu, Y. (2019). Numerical methods for solving space fractional partial differential equations using Hadamard finite-part integral approach, Communications on Applied Mathematics and Computation, 1(4), 505–523; Liu, Y., Khan, M., Yan, Y. (2016). Fourier Spectral Methods for Some Linear Stochastic Space-Fractional Partial Differential Equations. Mathematics, 4(3), 45. 10.3390/math4030045; Yanzhi, L., Roberts, J., & Yan, Y. (2018). Detailed error analysis for a fractional Adams method with graded meshes. Numerical Algorithms, 78(4), 1195-1216, 10.1007/s11075-017-0419-5; Yang, Y., Yan, Y., & Ford, N. (2017). Some time stepping methods for fractional diffusion problems with nonsmooth data. Computational Methods in Applied Mathematics, 18(1), 129-146, 10.1515/cmam-2017-0037; Fan L., Yan Y. (2019) A High Order Numerical Method for Solving Nonlinear Fractional Differential Equation with Non-uniform Meshes. In: Nikolov G., Kolkovska N., Georgiev K. (eds) Numerical Methods and Applications. NMA 2018. Lecture Notes in Computer Science, vol 11189. Springer, 10.1007/978-3-030-10692-8_23.

- Jimei University: Collaboration with Liang Zongqi e.g. F. Liu, Z. Liang, Y. Yan, Optimal convergence rates for semidiscrete finite element approximations of linear space-fractional partial differential equations under minimal regularity assumptions, Journal of Computational and Applied Mathematics, 352 (2019), 409-425, 10.1016/j.cam.2018.12.004. Also Wu, X., Yan, Y., & Yan, Y. (2020). An analysis of the L1 scheme for stochastic subdiffusion problem driven by integrated space-time white noise. Applied Numerical Mathematics, 157, 67-87.

- University of Tabriz: Asl, M. S., Javidi, M., & Yan, Y. (2018). A novel high-order algorithm for the numerical estimation of fractional differential equations. Journal of Computational and Applied Mathematics, 342, 180-201, 10.1016/j.cam.2017.12.047.

- Indian Institute of Technology: Collaboration with Amiya Pani - Wang, Yanyong & Yan, Yuyuan & Yan, Yubin & Pani, Amiya. (2020). Higher Order Time Stepping Methods for Subdiffusion Problems Based on Weighted and Shifted Grünwald–Letnikov Formulae with Nonsmooth Data. Journal of Scientific Computing. 83. 10.1007/s10915-020-01223-y.

- Lagos State Polytechnic and Landmark University Nigeria: Olakunle, S., Kareem, R. & Yan, Y. (2019). Analysis of transient Rivlin-Ericksen fluid and irreversibility of exothermic reactive hydromagnetic variable viscosity. Journal of applied and computational mechanics 6(1) 26-36, 10.22055/JACM.2019.28216.1460.

- University College London and Hong Kong Polytechnic University: Jin, B., Yan, Y. & Zhou, Z. (2019). Numerical approximation of stochastic time-fractional diffusion. ESAIM: M2AN, 53(4), 1245-1268

- Kocaeli University (Turkey) and RUDN University (Russia): Yenicerioglu, A., Pinelas, S. & Yan, Y. (2019). On the behavior of the solutions for linear autonomous mixed type difference equation. Rendiconti del Circolo Matematico di Palermo Series 2, 69, 787–801, 10.1007/s12215-019-00435-y.

- Tianjin University of Commerce: Zhang, G., Zhang, R. and Yan, Y. (2020). The diffusion-driven instability and complexity for a single-handed discrete Fisher equation, Applied Mathematics and Computation, 371, 124946.

- Guangdong University of Technology and Hunan Normal University China: Qiao L, Xu D, Yan Y. (2020). High-order ADI orthogonal spline collocation method for a new 2D fractional integro-differential problem. Mathematical Methods in the Applied Sciences, 43(8), 1-17.

4.2 Wider activities and contributions to the research base, economy and society

Ford and Roberts gave keynote lectures at the Fifth International Workshop on Analysis & Numerical Approximations in Singular Problems, Lagos, Portugal, October 2015, and at IWANASP 2018, Cagliari, Italy, July 2018.

Kavallaris was a member of the organising committee for the Mathematical Biology on the Mediterranean Conference, Samos, Greece, September 2019, and spoke on “insights for the impact of intratumoral heterogeneity on tumor Progression”. Also “Nonlocal Models in Replicator Dynamics” at the Fractional Partial Differential Equations Group Meeting at Brown University, USA, June 2018. “Finite-time blow-up of a class of non-local stochastic parabolic problems”, September 2019, Chester. Kavallaris organised an LMS Workshop “On Mathematical and Computational Modelling of Biological Systems”, Chester, September 2015 and spoke on “Mathematical Analysis of shadow-systems of an activator-inhibitor reaction-diffusion system”.

Yan spoke at Numerical methods for SPDE: 20 successful years and future challenges, in honour of Stig Larsson, Mittag-Leffler institute, Sweden, May, 2019; and arranged a minisymposium at the Conference on the Mathematics of Finite Elements and Applications (MAFELAP) June 2016, Brunel

University, speaking on “An analysis of the modified L1 scheme for the time-fractional partial differential equations with nonsmooth data”. Yan spoke at Numerical Methods for Fractional-Derivative Problems, April 2019, Beijing Computational Science Research Center, on “Detailed error analysis for a fractional Adams method with graded meshes” and organised a minisymposium on Fractional-derivative problems at the 28th Biennial Conference on Numerical Analysis, June 2019, Strathclyde and spoke on “Laplace transform method for solving the fractional cable equation with nonsmooth data”.

Antonopoulou spoke at the Spring School on Random Interfaces, University of Augsburg, Germany, March 2019, and at 'Numerical Analysis of Partial Differential Equations: A conference in honour of Vassilios Dougalis', Athens, Greece, May 2018, and in Workshop on PDEs in Physics and Materials Science, IACM-FORTH, University of Crete, Heraklion, Greece, May 2018. Also minisymposium “Adaptive methods and singular solutions of nonlinear problems PDEs from phase transition problems,” London, June 2016; Numerical Mathematics Departmental Seminar, Germany, November 2016; Stochastic Analysis and Mathematical Finance seminar, York, February 2020; and Department of Mathematics and Statistics Analysis seminar, Western Australia, August 2020.

Karakatsani organised an LMS workshop on A Posteriori Error Control and Mesh Adaptivity for Time Dependent and Nonlinear Problems in August 2015 and was invited to speak at the 9th Numerical Methods for Evolution Equations Conference, September 2018, Crete, and at the First Congress of Greek Mathematicians, June 2018, Athens. Also “On the error control for fully discrete approximations of evolution PDEs” in Ioannina, Greece, September 2017, Warwick, December 2016, Maryland, February 2016; School of Applied Mathematical and Physical Sciences, Athens, December 2014, and Department of Mathematics and Applied Mathematics, Crete, December 2014.

Mc Auley spoke at “Computational modelling of metabolic health”, Cambridge, October 2015, at Age Concern, Liverpool, March 2017 and at the Centre for Musculoskeletal Ageing, York January 2020.

The members of the Mathematical Sciences UoA additionally have the following roles:

Antonopoulou:
Member of the London Mathematical Society and Departmental representative,
EWM (European Women in Mathematics) Member,
AMS (Mathscinet) reviewer,
zbMATH reviewer,
External examiner for the Mathematics BSc programme at the University of Derby, UK, since 2019,
Various book reports such as for Taylor and Francis,
Various referee reports in refereed mathematical journals such as: Comptes Rendus Mathematique, Journal Zeitschrift für angewandte Mathematik und Physik, Mathematics of Computation, IMA Journal of Numerical Analysis, Journal of Scientific Computing,
Received a Prize of the Academy of Athens Greece for her work in Mathematical Analysis, together with her collaborator Prof. Kamvissis - best research journal publication from Greek authors in Mathematical Analysis for the years 2015-2016.

Ford:
Member of the London Mathematical Society,
Fellow of the Institute of Mathematics and its Applications,
AMS (Mathscinet) reviewer,
zbMATH reviewer,
IWANASP 2015, Guest Editor of Proceedings Volume, Special Issue of Applied Numerical Mathematics. Plenary talk on Mathematical modelling of autoimmunity,
IWANASP 2018, Cagliari Member of Scientific Committee, Guest Editor of Proceedings Volume, Special Issue of Applied Numerical Mathematics. Plenary talk on the contribution of Christopher TH Baker,
Management Committee member for COST (European Cooperation in Science and Technology) Action CA15225 – Fractional Systems (2016-2021) Talks at COST workshops in 2016, 2018, 2019.

Member of Working Group 1: Fractional calculus and mathematical models and Working Group 4: Utilization of fractional-order systems in engineering and biomedical research.
Journal Editorial Boards:

SIAM Journal of Scientific Computing (until 2019)
Journal of Integral Equations and Applications
Fractional Calculus and Applied Analysis
Applied Numerical Mathematics
Fractional Differential Calculus (until 2020)

Expert evaluator and Vice Chair for Horizon 2020, the European Research Council, European Science Foundation, the La Caixa Foundation, the National Center of Science and Technology Evaluation, Kazakhstan; National Science Centre, Poland; the Central Finance and Contracting Agency (CFCA), Latvia; UEFISCDI, Romania; Czech Science Foundation.

Gildea:
Panel member of European Science Foundation – Science Connect
Reviewer for:

Journal of Pure and Applied Mathematics,
Cryptography and Communications,
Journal of Algebra and its Applications,
Finite Fields and their Applications,
Designs Codes and Cryptography,
International Electronic Journal of Algebra,
International Journal of Group Theory,
IEEE Transactions on Information Theory,
Acta Mathematica. Academiae Paedagogicae Nyiregyhaziensis,
Algebra;
Czechoslovak Mathematical Journal,
International Journal of Information and Coding Theory,
Indian Academy of Sciences. Proceedings. Mathematical Sciences,
Beitrage zur Algebra und Geometrie, Contributions to Algebra and Geometry,
Publicationes Mathematicae Debrecen,
Algebras and Representation Theory
Asian Bulletin of Mathematics.

Karakatsani:
Reviewer for:

IMA Journal of Numerical Analysis,
Computer Methods in Applied Mechanics and Engineering,
Computational and Applied Mathematics,
Applications of Mathematics,
Open Mathematics,
Advances in Computational Mathematics.

Kavallaris:
Member of LMS since December 2013,
Member of the Editorial Board for the scientific journal PLOS ONE-Mathematical Biology since July 2018,
Handling editor of special volume “Mathematical Modelling of Epidemiology" to be published in January 2020,
Member of LMS Library committee 2015-2018,
External Examiner for the Undergraduate Programme on Applied Mathematics for Xi’an Jiaotong – Liverpool University (in China) since 2017,
Member of the Management Chair Committee for “The 4th Symposium on Quantitative Finance and Risk Analysis (QFRA 2018)”, 7-8 June 2018, Mykonos, Greece,
Member of the Management Chair Committee for “The 5th Symposium on Quantitative Finance and Risk Analysis (QFRA 2019)”, 26-28 June 2019, Kos Island, Greece,

External Examiner for PhD examination of the thesis “Using Fisher information approach in nonlinear dynamical system” by Avan Safar Elias Al-Saffar, School of Mathematics and Statistics, University of Sheffield, March 2018,
Visiting Professor at Technical University of Vienna June-July 2019,
Academic referee for three book proposals for Oxford University Press, Cambridge Press and CRC Press for the period 2015-2019,
Author of the book: Kavallaris, Nikos I., Suzuki, Takashi, Non-local partial differential equations for engineering and biology. Mathematical modelling and analysis. Mathematics for Industry 31. Springer, 2018.

Roberts:
Chartered Mathematician,
Chartered Scientist,
Fellow of the Institute of Mathematics and its Applications,
University of Chester’s representative to the London Mathematical Society,
Fellow of the Higher Education Academy,
STEM ambassador.

Yan:
Review Editor of the journal of Frontiers in Physics, 2018-,
Computational methods for differential equations (CMDE), Iran, 2019-,
Applied Numerical Mathematics, Elsevier, 2020-,
International Journal of Applied Mathematics (IJAM), 2017-,
Editorial board member of Enlightenment of Pure and Applied Mathematics 2015-,
Associate Editor of the Journal of Franklin Institute, 2007-2015,
Mathscinet Reviewer since 2006,
Member of SIAM since 2004,
Reviewer for Mathematical Reviews,
Referee for Journals: IMA J. Numerical Mathematics, BIT, Journal Computational Physics, Applied Mathematics and Computation, International Journal of System Science, SIAM Journal of Numerical Analysis,
Reviewer of EPSRC research grants.