

Arran Fernandez BA MMath PhD

Current email: arran.fernandez@emu.edu.tr

Current address: Department of Mathematics, Faculty of Arts and Sciences, Eastern Mediterranean University, William Shakespeare Street, 99628 Famagusta, Northern Cyprus, via Mersin-10, Turkey

Date of birth: 14 Jun 1995

Citizenship: United Kingdom

Marital status: bachelor

Main research interests: fractional calculus, fractional differential equations, analytic number theory, asymptotic analysis

[MathSciNet profile](#)

[Google Scholar profile](#)

[ResearchGate profile](#)

Education

- 2014–18 PhD, Department of Applied Mathematics & Theoretical Physics, University of Cambridge
Thesis title: Analysis in Fractional Calculus and Asymptotics related to Zeta Functions
Supervisor: Prof. Athanassios S. Fokas
Examiners: Dr Anthony Ashton, Prof. H. M. Srivastava
- 2013–14 MMath, University of Cambridge ("Part III")
Result: Distinction
- 2010–13 BA, University of Cambridge – Mathematical Tripos
Result: Senior Wrangler (top student of the year in finals) – youngest ever
- 2008–10 A-levels in Mathematics, Further Mathematics, and Physics
Result: score 590+/600 in each subject
- 2009–10 GCSEs in English Language, English Literature, and French
Result: A* grade in each subject
- 2001–03 GCSEs in Mathematics, at 3 levels
Result: top grade each time (D, B, A*) – youngest ever each time

Awards and prizes

- 2018 Invited Speaker at the International Conference on Fractional Differentiation and its Applications, Amman, Jordan.
- 2016 Honourable mention for one of the four best talks at 2nd-year graduate student mini-conference, Department of Applied Mathematics and Theoretical Physics, University of Cambridge.
- 2016 Smith-Knight / Rayleigh-Knight Prize essay, Group 4.
- 2014–18 Invitations to events for best teachers (as voted by students) at various Cambridge colleges: Pembroke, St. Catharine's, Emmanuel, Downing, Newnham, Girton.
- 2011–13 R A Watchman Prize (each year), Fitzwilliam College, University of Cambridge.
- 2013 Clothworkers Scholarship, Fitzwilliam College, University of Cambridge.
- 2012 Clough Scholarship, Fitzwilliam College, University of Cambridge.
- 2011 1912 Scholarship, Fitzwilliam College, University of Cambridge.

Research publications

T. Abdeljawad, A. Fernandez, "On a new class of fractional difference-sum operators with discrete Mittag-Leffler kernels", *Chaos: An Interdisciplinary Journal of Nonlinear Science*, accepted 2019. Preprint available from arXiv:1901.08268.

A.K. Golmankhaneh, A. Fernandez, "Fractal calculus of functions on Cantor tartan spaces", *Fractal and Fractional* 2(4) (2018).

A. Fernandez, D. Baleanu, "Differintegration with respect to functions in fractional models involving Mittag-Leffler functions", *SSRN* 3275746 (2018).

J.-D. Djida, A. Fernandez, "Interior regularity estimates for a degenerate elliptic equation with mixed boundary conditions", *Axioms* 7(3) (2018), pp. 1–16.

A. Fernandez, D. Baleanu, A.S. Fokas, "Solving PDEs of fractional order using the unified transform method", *Applied Mathematics and Computation* 339C (2018), pp. 738–749.

A. Fernandez, D. Baleanu, H.M. Srivastava, "Series representations for fractional-calculus operators involving generalised Mittag-Leffler functions", *Communications in Nonlinear Science and Numerical Simulation*, 67 (2019), pp. 517–527.

A.K. Golmankhaneh, A. Fernandez, A.K. Golmankhaneh, D. Baleanu, "Diffusion on middle- ξ Cantor sets", *Entropy* 20(7) (2018).

A. Fernandez, A.S. Fokas, "Asymptotics to all orders of the Hurwitz zeta function", *Journal of Mathematical Analysis and Applications* 465(1) (2018), pp. 423–458.

A. Fernandez, "The Lerch zeta function as a fractional derivative", *Banach Center Publications*, accepted 2018. Preprint available from arXiv:1804.07936.

A. Fernandez, "An elliptic regularity theorem for fractional partial differential operators", *Computational and Applied Mathematics* 37 (2018), pp. 5542–5553.

A. Fernandez, D. Baleanu, "The mean value theorem and Taylor's theorem for fractional derivatives with Mittag-Leffler kernel", *Advances in Difference Equations* 2018:86 (2018).

A. Fernandez, E.A. Spence, A.S. Fokas, "Uniform asymptotics as a stationary point approaches an endpoint", *IMA Journal of Applied Mathematics* 83(1) (2018), pp. 204–242.

D. Baleanu, A. Fernandez, "On some new properties of fractional derivatives with Mittag-Leffler kernel", *Communications in Nonlinear Science and Numerical Simulation* 59 (2018), pp. 444–462.

D. Baleanu, A. Fernandez, "A generalisation of the Malgrange–Ehrenpreis theorem to find fundamental solutions to fractional PDEs", *Electronic Journal of Qualitative Theory of Differential Equations* 15 (2017), pp. 1–12.

Research publications – ongoing

A. Fernandez, C. Ustaoglu, "On some analytic properties of the generalised proportional fractional differintegrals", *Integral Transforms and Special Functions*, under review.

A. Fernandez, "A complex analysis approach to Atangana–Baleanu fractional calculus", *Mathematical Methods in the Applied Sciences*, under review.

A.K. Golmankhaneh, S. Ashrafi, D. Baleanu, A. Fernandez, "Brownian motion on Cantor sets", *International Journal of Nonlinear Science and Numerical Simulation*, under review.

A. Fernandez, C. Ustaoglu, M.A. Özarslan, "Analytical Development of Incomplete Riemann–Liouville Fractional Calculus", book chapter for *Advances in Special functions and Analysis of Differential Equations* (CRC Press), under review.

A. Fernandez, M.A. Özarslan, D. Baleanu, "On fractional calculus with general analytic kernels", *Applied Mathematics and Computation*, under review.

A. Fernandez, D. Baleanu, "A novel definition of fractional differintegrals with Mittag-Leffler kernel having a semigroup property", *Filomat*, under review. Preprint available from arXiv:1807.10601.

Research presentations

- Jul 2018 "Differentiation with respect to functions in fractional models involving Mittag-Leffler functions", contributed talk, International Conference on Fractional Differentiation and its Applications 2018 (Amman, Jordan).
- Jul 2018 "Generalisation and reduction of fractional models", invited talk, International Conference on Fractional Differentiation and its Applications 2018 (Amman, Jordan).
- Oct 2017 "Fractional Calculus and Analytic Number Theory", invited talk, Analysis and Applied Mathematics Seminar Series, Çankaya University, Ankara, Turkey.
- Sep 2017 "Asymptotics to all orders of the Hurwitz zeta function", contributed talk, Number Theory Week 2017 (Poznań, Poland).
- May 2017 "New properties of fractional derivatives defined using Mittag-Leffler kernel", contributed talk, International Conference on Recent Advances in Pure and Applied Mathematics 2017 (Ephesus, Turkey).
- Jul 2016 "Explicit solutions to FPDEs via the Fokas method and fundamental solutions", contributed talk, International Conference on Fractional Differentiation and its Applications 2016 (Novi Sad, Serbia).
- May 2016 "Constructing solutions to linear fractional-order PDEs", departmental seminar, Cambridge Analysts Knowledge Exchange, Faculty of Mathematics, University of Cambridge, UK.
- May 2016 "Fractional PDEs", contribution to graduate seminar series, Department of Applied Mathematics and Theoretical Physics, University of Cambridge, UK.
- Aug 2015 "Fractional calculus and the Fokas method", contributed talk, Young Researchers in Mathematics 2015 (Oxford, UK).
- Nov 2012 "Introduction to Fractional Calculus", series of 1-hour talks, Faculty of Mathematics, University of Cambridge, UK.
- Oct 2012 "Introduction to Fractional Calculus", invited talk, PDE Working Group Seminar, Imperial College London, UK.

Teaching

Supervisor (small-group teaching sessions) at the University of Cambridge in the following courses:

- 2013–18 Metric & Topological Spaces (2nd-year course)
- 2013–14 Linear Analysis (3rd-year course)
- 2014–18 Further Complex Methods (3rd-year course)
- 2014–15 Linear Algebra (2nd-year course)
- 2014–18 Number Theory (3rd-year course)
- 2015–18 Complex Analysis (2nd-year course)

This teaching was provided for the following colleges at the University of Cambridge: Christ's, Churchill, Clare, Corpus Christi, Downing, Emmanuel, Girton, Gonville & Caius, Homerton, Hughes Hall, Jesus, Magdalene, Murray Edwards, Newnham, Pembroke, Queens', Selwyn, St. Catharine's, St. Edmund's, St. John's.

Lecturer at the Eastern Mediterranean University for the following courses:

- 2018– Calculus 1 (undergraduate course)
- 2018– Fractional Calculus (graduate course)

Reviewing

Invited peer reviewer for the following journals:

- *Acta Applicandae Mathematicae* (Springer)
- *Journal of Nonlinear Sciences and Applications* (ISR Publications)
- *Communications in Nonlinear Science and Numerical Simulation* (Elsevier)
- *Computational and Applied Mathematics* (Springer)
- *Progress in Fractional Differentiation and Applications* (Natural Sciences Publishing)
- *Journal of Taibah University for Science* (Taylor & Francis)
- *Mathematical Methods in the Applied Sciences* (Wiley)
- *Applied Mathematics and Computation* (Elsevier)
- *Journal of Functional Analysis* (Elsevier)
- *Axioms* (Multidisciplinary Digital Publishing Institute)
- *Reports on Mathematical Physics* (Elsevier)
- *AIMS Mathematics* (AIMS Press)
- *Advances in Difference Equations* (Springer)
- *Revista Colombiana de Matemáticas* (Colombian Mathematical Society)

Other activities

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| 2018 | "Mathematics: a Passion between Arts and Sciences", invited talk, Abdul Hameed Shoman Foundation, Amman, Jordan. |
| 2018 | "The Career of a Genius", invited talks, Eastern Mediterranean University, Famagusta, Northern Cyprus. |
| 2016–18 | Founder and President of the Clare Hall Mathematical Association, a graduate student society at the University of Cambridge |
| 2003 | TV appearance, <i>The Terry and Gaby Show</i> , UK |
| 2001 | TV appearance, <i>Menschen der Woche</i> (Person of the Week), Germany |

Academic referees

Professor Athanassios S. Fokas: Chair of Nonlinear Mathematical Science, University of Cambridge, UK.

[Homepage](#)

Email: tf227@cam.ac.uk, T.Fokas@damtp.cam.ac.uk

Department of Applied Mathematics and Theoretical Physics, Wilberforce Road, Cambridge, CB3 0WA, United Kingdom.

Professor Dumitru Baleanu: Çankaya University, Ankara, Turkey, and Institute of Space Sciences, Bucharest, Romania.

[Homepage](#)

Email: dumitru@cankaya.edu.tr

Department of Mathematics, Faculty of Arts and Sciences, Balgat, Ankara 06530, Turkey.