

Arran Fernandez BA MMath PhD

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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
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Research publications – accepted/published

D. Baleanu, **A. Fernandez**, "On fractional operators and their classifications", *Mathematics*, 7(9) (2019), 830. DOI: [10.3390/math7090830](https://doi.org/10.3390/math7090830)

J.-D. Djida, **A. Fernandez**, I. Area, "Well-posedness results for fractional semi-linear wave equations", *Discrete & Continuous Dynamical Systems – B* 25(2) (2020), pp. 569–597. DOI: [10.3934/dcdsb.2019255](https://doi.org/10.3934/dcdsb.2019255)

T. Abdeljawad, **A. Fernandez**, "On a new class of fractional difference-sum operators with discrete Mittag-Leffler kernels", *Mathematics* 7(9) (2019), 772. DOI: [10.3390/math7090772](https://doi.org/10.3390/math7090772)

A. Fernandez, C. Ustaoglu, "On some analytic properties of tempered fractional calculus", *Journal of Computational and Applied Mathematics* 366 (2020), 112400. DOI: [10.1016/j.cam.2019.112400](https://doi.org/10.1016/j.cam.2019.112400)

A. Fernandez, D. Baleanu, H.M. Srivastava, "Corrigendum to "Series representations for fractional-calculus operators involving generalised Mittag-Leffler functions" [Commun. Nonlinear Sci. Numer. Simulat. 67 (2019) 517–527]", *Communications in Nonlinear Science and Numerical Simulation* 82 (2020), 104963. DOI: [10.1016/j.cnsns.2019.104963](https://doi.org/10.1016/j.cnsns.2019.104963)

A.K. Golmankhaneh, S. Ashrafi, D. Baleanu, **A. Fernandez**, "Brownian motion on Cantor sets", *International Journal of Nonlinear Science and Numerical Simulation*, accepted 2019.

- A.K. Golmankhaneh, **A. Fernandez**, "Random variables and stable distributions on fractal Cantor sets", *Fractal and Fractional* 3(2) (2019), 31. DOI: [10.3390/fractalfract3020031](https://doi.org/10.3390/fractalfract3020031)
- H.M. Srivastava, **A. Fernandez**, D. Baleanu, "Some new fractional-calculus connections between Mittag-Leffler functions", *Mathematics* 7(6) (2019), 485. DOI: [10.3390/math7060485](https://doi.org/10.3390/math7060485)
- A. Fernandez**, "A complex analysis approach to Atangana–Baleanu fractional calculus", *Mathematical Methods in the Applied Sciences* (2019), pp. 1–18. DOI: [10.1002/mma.5754](https://doi.org/10.1002/mma.5754)
- A. Fernandez**, M.A. Özarslan, D. Baleanu, "On fractional calculus with general analytic kernels", *Applied Mathematics and Computation* 354 (2019), pp. 248–265. DOI: [10.1016/j.amc.2019.02.045](https://doi.org/10.1016/j.amc.2019.02.045)
- A. Fernandez**, D. Baleanu, "A novel definition of fractional differintegrals with Mittag-Leffler kernel having a semigroup property", *Filomat* 33(1) (2019), pp. 245–254. DOI: [10.2298/FIL1901245F](https://doi.org/10.2298/FIL1901245F)
- A.K. Golmankhaneh, **A. Fernandez**, "Fractal calculus of functions on Cantor tartan spaces", *Fractal and Fractional* 2(4) (2018). DOI: [10.3390/fractalfract2040030](https://doi.org/10.3390/fractalfract2040030)
- 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. DOI: [10.3390/axioms7030065](https://doi.org/10.3390/axioms7030065)
- 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. DOI: [10.1016/j.amc.2018.07.061](https://doi.org/10.1016/j.amc.2018.07.061)
- 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. DOI: [10.1016/j.cnsns.2018.07.035](https://doi.org/10.1016/j.cnsns.2018.07.035)
- A.K. Golmankhaneh, **A. Fernandez**, A.K. Golmankhaneh, D. Baleanu, "Diffusion on middle- ξ Cantor sets", *Entropy* 20(7) (2018). DOI: [10.3390/e20070504](https://doi.org/10.3390/e20070504)
- 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. DOI: [10.1016/j.jmaa.2018.05.012](https://doi.org/10.1016/j.jmaa.2018.05.012)
- A. Fernandez**, "The Lerch zeta function as a fractional derivative", *Banach Center Publications* 118 (2019), pp. 113–124. Preprint available from arXiv:1804.07936. DOI: [10.4064/bc118-7](https://doi.org/10.4064/bc118-7)
- A. Fernandez**, "An elliptic regularity theorem for fractional partial differential operators", *Computational and Applied Mathematics* 37 (2018), pp. 5542–5553. DOI: [10.1007/s40314-018-0618-2](https://doi.org/10.1007/s40314-018-0618-2)
- 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). DOI: [10.1186/s13662-018-1543-9](https://doi.org/10.1186/s13662-018-1543-9)
- 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. DOI: [10.1093/imamat/hxx042](https://doi.org/10.1093/imamat/hxx042)
- 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. DOI: [10.1016/j.cnsns.2017.12.003](https://doi.org/10.1016/j.cnsns.2017.12.003)
- 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. DOI: [10.14232/ejqtde.2017.1.15](https://doi.org/10.14232/ejqtde.2017.1.15)

Research publications – ongoing

- H.M. Fahad, **A. Fernandez**, M. u. Rehman, M. Siddiqi, "Tempered and Hadamard-type fractional calculus with respect to functions", *Journal of Computational and Applied Mathematics*, submitted.
- A. Fernandez**, C. Kürt, M.A. Özarslan, "A naturally emerging bivariate Mittag-Leffler function and associated fractional-calculus operators", *Computational and Applied Mathematics*, submitted.
- A. Fernandez**, T. Abdeljawad, D. Baleanu, "Relations between fractional models with three-parameter Mittag-Leffler kernels", *Advances in Difference Equations*, under review.

A. Fernandez, C. Bouzouina, "Fractionalisation of complex d -bar derivatives", *Complex Variables and Elliptic Equations*, under review.

C. Kürt, M.A. Özarslan, **A. Fernandez**, "On a certain bivariate Mittag-Leffler function analysed from a fractional-calculus point of view", *Mathematical Methods in the Applied Sciences*, under review.

A. Fernandez, P.O. Mohammed, "Hermite–Hadamard inequalities in fractional calculus defined using Mittag-Leffler kernels", *Mathematical Methods in the Applied Sciences*, 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. Preprint available from arXiv:1904.02577.

Research presentations – international

- Jul 2019 "Models and classifications in fractional calculus", contributed talk, *International Society for Analysis, its Applications and Computation 2019* (Aveiro, Portugal).
- Jul 2019 "A general class of fractional-calculus operators and their applications", invited talk, *International Istanbul Summer School in Applied Mathematics 2019* (Istanbul, Turkey).
- Jul 2019 "Complex integrals in fractional calculus", contributed talk, *International Conference on Computational Methods in Applied Sciences 2019* (Istanbul, Turkey).
- Apr 2019 "Incomplete forms of fractional integrals and derivatives", contributed talk, *International Conference on Computational Mathematics and Engineering Sciences 2019* (Antalya, Turkey).
- Jul 2018 "Differintegration 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).
- Jun 2018 "A series formula for Prabhakar fractional operators", contributed talk, *International Conference on Applied Mathematics in Engineering 2018* (Balikesir, 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).
- Aug 2015 "Fractional calculus and the Fokas method", contributed talk, *Young Researchers in Mathematics 2015* (Oxford, UK).
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Research presentations – local

- Jul 2019 "Zeta functions expressed as fractional derivatives", invited talk, Seminar on Millennium Problems: Riemann Hypothesis, Institute of Mathematics, University of Santiago de Compostela, Spain.
- Apr 2018 "Fractional PDEs, Novel Fractional Models, and Asymptotic Analysis of Zeta Functions", invited talk, Mathematics Department Seminar Series, Bilkent University, Ankara, Turkey.

Oct 2017	"Fractional Calculus and Analytic Number Theory", invited talk, Analysis and Applied Mathematics Seminar Series, Çankaya University, Ankara, Turkey.
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.
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)
2019–	Calculus with Precalculus (undergraduate course)
2019–	Calculus 2 (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)
 - *Journal of Inequalities and Applications* (Springer)
 - *Filomat* (University of Nis)
 - *IEEE Access* (Institute of Electrical and Electronics Engineers)
 - *Fractal and Fractional* (Multidisciplinary Digital Publishing Institute)
 - *Applied Mathematics and Information Sciences* (Natural Sciences Publishing)
 - *Evolution Equations and Control Theory* (American Institute of Mathematical Sciences)
 - *International Journal of Analysis and Applications* (Etamaths Publishing)
 - *Mathematics* (Multidisciplinary Digital Publishing Institute)
 - *Punjab University Journal of Mathematics* (University of the Punjab)
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Awards and prizes

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| 2019 | 2 nd prize for Young Scientists (based on publications and citations) at International Conference on Computational Methods in Applied Sciences, Istanbul Gelisim University. |
| 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 2 nd -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. |
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Other activities

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| 2019 | "A Career in Mathematics", invited talks, Doğa College Famagusta and Türk Maarif College Güzelyurt, Northern Cyprus. |
| 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, *The Terry and Gaby Show*, UK
- 2001 TV appearance, *Menschen der Woche* (Person of the Week), Germany
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Academic referees

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

[Homepage](#)

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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.

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