

Vahagn Aslanyan

Research Interests

- My research interests are in model theory, a branch of mathematical logic, and its applications in number theory, geometry, algebra (including differential algebra), and analysis.
- In the past I did research in universal algebra, in particular, I explored the first and second order properties of De Morgan algebras.

Employment

- 2023 – present **Dame Kathleen Ollerenshaw Fellow (also supported by EPSRC Open Fellowship)**, *Department of Mathematics, University of Manchester, Manchester, UK.*
- 2022 – 2023 **Leverhulme Early Career Fellow**, *School of Mathematics, University of Leeds, Leeds, UK.*
- 2019 – 2022 **Senior Research Associate**, *School of Mathematics, University of East Anglia, Norwich, UK.*
- 2017 – 2019 **Postdoctoral Associate**, *Department of Mathematical Sciences, Carnegie Mellon University, Pittsburgh, PA, USA.*
- 2017 – 2019 **Junior Researcher**, *Institute of Mathematics, National Academy of Sciences, Yerevan, Armenia.*
- 2013 – 2017 **Tutor and TA**, *Mathematical Institute, University of Oxford, Oxford, UK.*

Education

- 2013 – 2017 **PhD in Mathematics**, *University of Oxford, Oxford, UK.*
 - Thesis title: *Ax-Schanuel Type Inequalities in Differentially Closed Fields*
 - Supervisors: Prof Jonathan Pila FRS, Prof Boris Zilber
- 2009 – 2013 **BSc in Mathematics**, *Yerevan State University, Yerevan, Armenia.*
 - Dissertation title: *De Morgan algebras*
 - Supervisor: Prof Yuri Movsisyan

Achievements, Awards, and Grants

- 2023 – 2028 EPSRC Open Fellowship, £1,107,934
- 2022 – 2025 Leverhulme Trust Early Career Fellowship, £168,000
- 2021 LMS Research in Pairs grant 42106 (to work with Chris Daw at the University of Reading)
- 2019 Emil Artin Junior Prize in Mathematics
- 2016 – 2017 AGBU UK Scholarship
- 2015 LMS research grant 81308 for co-organising the British Postgraduate Model Theory Conference
- 2013 – 2017 Luys Scholarship
- 2013 – 2016 Dulverton Scholarship, University of Oxford
- 2012 – 2013 Nominal Fellowship Djrbashian for excellence and research, Yerevan State University
- 2010 – 2012 Three Second Prizes, International Mathematics Competition for university students, Bulgaria
- 2010 Bronze Medal of Yerevan State University for excellence and scientific activity
- 2009 Bronze Medal, International Mathematical Olympiad, Bremen, Germany

Service

- 2022 – present Maintaining a [personal blog](#) for expository discussions on my research
- 2022 Co-organiser of the SEEMOD meeting at UEA
- 2020 – present UEA pure mathematics seminar co-organiser
- 2020 Co-organiser of the SEEMOD meeting at UEA (cancelled due to Covid-19)
- 2018 – present Grant reviewer for the Science Committee of Armenia
- 2017 – present Reviewer for *Selecta Mathematica*, *Journal of LMS*, *Mathematical Reviews*, *zbMATH*, etc.
- 2015 British Postgraduate Model Theory conference co-organiser
- 2015 – present Editing and creating Wikipedia articles related to my work (e.g. [Zilber-Pink conjecture](#), [Existential Closedness conjecture](#))

Preprints

- 4 V. Aslanyan, F. Gallinaro, Exponential sums equations and the Exponential Closedness conjecture, (2024), pp. 1–16. <https://arxiv.org/abs/2409.12860>
- 3 V. Aslanyan, Complex solutions of polynomial equations on the unit circle, (2024), pp. 1–15. <https://arxiv.org/abs/2409.12867>
- 2 V. Aslanyan, S. Eterović, V. Mantova, Equations involving the modular j -function and its derivatives, (2023), pp. 1–30. <https://arxiv.org/abs/2312.09974>
- 1 V. Aslanyan, S. Eterović, G. Fowler, Multiplicative relations among differences of singular moduli, (2023), pp. 1–36. <https://arxiv.org/abs/2308.12244>

Publications

- 24 V. Aslanyan, J. Kirby, Algebraic types in Zilber’s exponential field, to appear in *Model Theory*, (2024), pp. 1–14. <https://arxiv.org/abs/2405.01399>
- 23 V. Aslanyan, C. Daw, A note on unlikely intersections in Shimura varieties, *Journal of number theory*, (2024), pp. 212–222. <https://doi.org/10.1016/j.jnt.2024.02.015>
- 22 V. Aslanyan, The Existential Closedness and Zilber–Pink conjectures, *Model Theory*, (2024), pp. 599–624. <https://doi.org/10.2140/mt.2024.3.599>
- 21 V. Aslanyan, R. Henderson, M. Kamsma, J. Kirby, Independence relations for exponential fields, *Annals of Pure and Applied Logic*, (2023), pp. 1–25. <https://doi.org/10.1016/j.apal.2023.103288>
- 20 V. Aslanyan, J. Kirby, V. Mantova, A geometric approach to some systems of exponential equations, *International Mathematics Research Notices*, (2021), pp. 1–34. <https://doi.org/10.1093/imrn/rnab340>
- 19 V. Aslanyan, Adequate predimension inequalities in differential fields, *Annals of Pure and Applied Logic*, (2021), pp. 1–49. <https://doi.org/10.1016/j.apal.2021.103030>
- 18 V. Aslanyan, J. Kirby, Blurrings of the j -function, *Quarterly Journal of Mathematics*, (2021), pp. 1–16. <https://doi.org/10.1093/qmath/haab037>
- 17 V. Aslanyan, S. Eterović, J. Kirby, A closure operator respecting the modular j -function, *Israel Journal of Mathematics*, (2022), pp. 1–28. <https://doi.org/10.1007/s11856-022-2362-y>
- 16 V. Aslanyan, Weak Modular Zilber-Pink with Derivatives, *Mathematische Annalen*, (2021), pp. 1–38. <https://doi.org/10.1007/s00208-021-02213-7>
- 15 V. Aslanyan, Some remarks on atypical intersections, *Proceedings of the AMS*, (2021), pp. 1–15. <https://doi.org/10.1090/proc/15611>
- 14 V. Aslanyan, S. Eterović, J. Kirby, Differential Existential Closedness for the j -function, *Proceedings of the AMS*, 149:4 (2021), pp. 1417–1429. <https://doi.org/10.1090/proc/15333>

- 13 V. Aslanyan, Ax-Schanuel and strong minimality for the j -function, *Annals of Pure and Applied Logic*, 172:1 (2021). <https://doi.org/10.1016/j.apal.2020.102871>
- 12 V. Aslanyan, Existentially closed De Morgan algebras, *Algebra Universalis*, 81:4 (2020). <https://doi.org/10.1007/s00012-019-0633-1>
- 11 V. Aslanyan, Ax-Schanuel for linear differential equations, *Archive for Mathematical Logic*, 57:5-6 (2018), pp. 629–648. <https://doi.org/10.1007/s00153-017-0602-3>
- 10 V. Aslanyan, Definability of derivations in the reducts of differentially closed fields, *The Journal of Symbolic Logic*, 82:4 (2017), pp. 1252–1277. <https://doi.org/10.1017/jsl.2017.54>
- 9 V. Aslanyan, Characterization of zigzag De Morgan functions. *Discrete Math. Algorithms Appl.* 8 (2016), no. 2.
- 8 Yu. Movsisyan, V. Aslanyan, A functional completeness theorem for De Morgan functions, *Discrete Applied Mathematics*, 162 (2014), pp. 1–16.
- 7 Yu. Movsisyan, V. Aslanyan, Boole-De Morgan algebras and quasi-De Morgan functions, *Communications in Algebra*, 42:11 (2014), pp. 4757–4777.
- 6 Yu. Movsisyan, V. Aslanyan, Super-De Morgan functions and free De Morgan quasilattices, *Central European Journal of Mathematics*, 12 (2014), no. 12, pp. 1749–1761.
- 5 Yu. Movsisyan, V. Aslanyan, Super-Boolean functions and free Boolean quasilattices. *Discrete Math. Algorithms Appl.* 6 (2014), no. 2.
- 4 Yu. Movsisyan, V. Aslanyan, De Morgan functions and free De Morgan algebras. *Demonstr. Math.* 47 (2014), no. 2, pp. 271–283.
- 3 Yu. Movsisyan, V. Aslanyan, Subdirectly irreducible algebras with hyperidentities of the variety of De Morgan algebras, *Journal of Contemporary Mathematical Analysis*, 48 (2013), no. 6, pp. 241–246.
- 2 Yu. Movsisyan, V. Aslanyan, Algebras with hyperidentities of the variety of De Morgan algebras, *Journal of Contemporary Mathematical Analysis*, 5 (2013), no. 5, pp. 233–240.
- 1 Yu. Movsisyan, V. Aslanyan, Hyperidentities of De Morgan algebras, *Logic Journal of the IGPL*, 20(2012), pp. 1153–1174.

Conference and seminar talks

- 8 Dec 2023 Pure Mathematics Colloquium, University of Manchester, UK, “A remark on unlikely intersections”
- 28 Nov 2023 Number Theory seminar, University of Manchester, UK, “Multiplicative relations among differences of singular moduli”
- 18 Oct 2023 Logic seminar, University of Manchester, UK, “Equations involving the modular j -function and its derivatives”
- 7 Jun 2023 Logic Colloquium, Milan, Italy, “The Existential Closedness with Derivatives conjecture for the j -function”
- 15 Feb 2023 London Logic seminar, Imperial College London, UK, “Model-theoretic algebraic closure on Zilber’s field”
- 10 Feb 2023 MGMT, University of Leeds, UK, “Model-theoretic algebraic closure on Zilber’s field”
- 27 Jan 2023 LYMoTS, University of Manchester, UK, “Existential Closedness and Zilber-Pink for the j -function with derivatives”
- 23 Nov 2022 Logic seminar, University of Manchester, UK, “Model-theoretic algebraic closure on Zilber’s field”
- 3 Nov 2022 Logic seminar, University of Oxford, UK, “Model-theoretic algebraic closure on Zilber’s field”
- 25 May 2022 Pure mathematics seminar, University of Reading, UK, “A remark on unlikely intersections”
- 9 Jun 2021 Models and Sets, University of Leeds, UK, “A geometric approach to some systems of exponential equations”

- 11 Mar 2021 Logic seminar, Università degli Studi della Campania Luigi Vanvitelli, Italy, “A geometric approach to certain systems of exponential equations”
- 1 Mar 2021 Online seminar: Topological and Differential Expansions of O-minimal Structures, “Blurrings of the j -function”, Recording available [here](#).
- 25 Nov 2020 Manchester logic seminar, University of Manchester, UK, “Blurrings of the j -function”
- 24 Nov 2020 LMS Online Lecture Series: An Excursion Into Model Theory and Its Applications, “Introduction to o-minimality and applications”. Recording available [here](#).
- 16 Jun 2020 Berkeley model theory seminar, UC Berkeley, USA, “Blurrings of the j -function”
- 15 Apr 2020 Number Theory learning seminar, UC Berkeley, USA, “Introduction to the Zilber-Pink conjecture”
- 11 Dec 2019 SEEMOD, Imperial College London, UK, “Strongly minimal sets in j -reducts of differentially closed fields”
- 11 Nov 2019 Pure mathematics seminar, UEA, UK, “A remark on atypical intersections”
- 7 Nov 2019 Logic Seminar, Oxford, UK, “Functional Modular Zilber-Pink with Derivatives”
- 9 Apr 2019 Logic Seminar, CMU, USA, “The Conjecture on Intersections with Tori”
- 26–29 Jun 2018 Around Functional Transcendence, University of Oxford, UK, “Weak Modular Zilber-Pink with Derivatives”
- 16–19 May 2018 ASL North American Annual Meeting, WIU, USA, “Ax-Schanuel and strongly minimal sets in reducts of differentially closed fields”
- 17 Apr 2018 Logic Seminar, CMU, USA, “Geometry of strongly minimal sets in differentially closed fields”
- 14 Nov 2017 Logic Seminar, UIUC, USA, “Ax-Schanuel and Strong Minimality”
- 23 Oct 2017 Model Theory Seminar, CMU, USA, “Schanuel’s conjecture and the Ax-Schanuel theorem”
- 23 Oct 2017 Logic Seminar, CMU, USA, “Schanuel’s conjecture, pseudo-exponentiation and Ax’s theorem”
- 13 Oct 2017 Kolchin Seminar in Differential Algebra, CUNY, USA, “Ax-Schanuel and Strong Minimality”
- 20 Feb 2017 Pure Mathematics Research Seminar, UEA, UK, “Ax-Schanuel and existential closedness for the j -function”
- 6 Jul 2016 SEEMOD, University of Oxford, UK, “Ax-Schanuel type theorems and geometry of strongly minimal sets in DCF_0 ”
- 13 Apr 2016 Logic seminar, University of Manchester, UK, “Ax-Schanuel for linear differential equations”
- 4 Feb 2016 Logic advanced class, University of Oxford, UK, “Definability of derivations in the reducts of differentially closed fields, II”
- 30 Apr 2015 Logic advanced class, University of Oxford, UK, “Definability of derivations in the reducts of differentially closed fields, I”
- 7–9 Jan 2015 British Postgraduate Model Theory Conference, Oxford, UK, “Ax-Schanuel type theorems in differential fields”
- 23 Oct 2014 Logic advanced class, University of Oxford, UK, “Ax-Schanuel type inequities in differential fields”
- 5 Jun 2014 Logic advanced class, University of Oxford, UK, “The problem of definability of the ring of integers in number fields (after Poonen)”
- 11 Feb 2014 Logic advanced class, University of Oxford, UK, “A survey of the theory of differentially closed fields, II”
- 1–3 Nov 2012 Mathematical Logic and Applications, Yerevan, Armenia, “Hyperidentities of De Morgan algebras”

Teaching Experience

2019–2021 **University of East Anglia**

Mathematical Logic, Number Theory, LMS online lecture series in Model Theory

2017–2019 **Carnegie Mellon University**

Number Theory \times 2, Abstract Algebra, Linear Algebra

2013–2017 **University of Oxford**

Model Theory, Algebraic Number Theory, Analytic Number Theory, Galois Theory, Logic, Set Theory

Languages

Armenian, English, Russian