CURRICULUM VITAE

NAME: Robert Ian GOLDBLATT

NATIONALITY: New Zealand

BIRTH: 21 April, 1949

ADDRESS: School of Mathematics and Statistics
Victoria University of Wellington
P.O. Box 600
Wellington
New Zealand

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PRESENT POSITION: Emeritus Professor of Mathematics

DEGREES: BA 1969, BA Honours (1st Class) 1970, PhD 1974, DSc 1983.

RESEARCH FIELD: Mathematical logic, general algebra.

POSITIONS HELD:

Victoria University :	
1971 - 84	Junior Lecturer, Lecturer, Reader, Personal Chair (1981)
1985 -	Professor of Pure Mathematics
1987 -91, 1996	Chairperson of Mathematics Department
1990-1992	Member, University Council (elected staff representative)
1996-98	Head of School of Mathematical and Computing Sciences
2018	Emeritus Professor
Simon Fraser University :	Visiting Scientist, Dec 1976 – Jan 1977
Oxford University :	Visiting Fellow, Mathematical Institute, Aug 1977-June 1978
Auckland University :	Exchange Professor, Jan-Dec 1984
Stanford University :	Visiting Professor, Dec 1985 - Jan 1987
Australian National University :	Visiting Fellow, Sept-Nov 1992
Japan Advanced Institute for Science and Technology :	Visiting Fellow, November 2001
Bologna University, Institute For Advanced Study	Senior Visiting Fellow, November 2002

AWARDS, HONOURS, APPOINTMENTS:

1. University Grants Committee Postgraduate Scholarship 1971 (declined)
2. Nuffield Foundation Fellowship, held at Oxford University 1977 - 78.
3. Research Medal of the New Zealand Association of Scientists, 1985.
4. Fulbright Senior Research Scholarship, held at Stanford University 1986.
5. Fellow of the Royal Society of New Zealand, 1990-
6. New Zealand Mathematical Society Research Award, 1991 (inaugural recipient).
7. Fellow of the NZ Mathematical Society 1996 (inaugural accreditation).
8. President, NZ Mathematical Society, 1997-1999.
9. New Zealand representative to the International Mathematical Union 1997-2005.
10. Marsden Fund Council (Ministerial appointment), 1998 – 2001.
11. Centres of Research Excellence (CoRE) establishment – Convener of Assessment Panel in Physical Engineering and Mathematical Sciences, 2002.
12. Director, NZ Institute of Mathematics and its Applications (NZIMA) thematic programme in Logic and Computation, 2003 – 2006.
13. Honorary Life Member, NZ Mathematical Society, 2004 -
14. Coordinating Editor, The Journal of Symbolic Logic 2004 -2006.
15. Principal Investigator, Marsden Fund research project on *Semantic Analysis of Substructural Logics*, 2006- 2009.
16. Victoria University Research Excellence Award, 2007.
17. Jones Medal for lifetime achievement in the mathematical sciences, awarded by the Royal Society of NZ, 2012.
18. Wendy Huang Visiting Fellow, National Taiwan University, Taipei, 2016.

EDITORIAL BOARDS:

The Journal of Symbolic Logic 2001 – 2007,
- including two years as Coordinating Editor.

Studia Logica: Managing Editor 1993 - 2013, Advisory Board 1981-1993,
Associate Editor 2013 -

Notre Dame Journal of Formal Logic 2006 - 2018
Journal of Applied Logic 2003 - 2018
Journal of Applied Non-Classical Logics 1991-2020
New Zealand Journal of Mathematics 1991- 2005
Journal of Automated Reasoning 1984 - 1996

PROFESSIONAL SOCIETIES:

- American Mathematical Society - Life Member
- Association for Symbolic Logic
  Member, Committee on Logic in Australasia 1988 – 1994
  Executive Committee and Council member, 2000 - 2002
- London Mathematical Society. Senior member from 2022
- New Zealand Mathematical Society
  Foundation member
  Elected to Council 1987-1993, 1996-2000
  President 1997-1999
- Royal Society of New Zealand
  Council member (Fellow's Representative) 1991 - 1995
  Standing Committee on Mathematical and Information Sciences 1997-9
  Mathematical and Information Sciences Fellowship Selection Panel, 2003 -2007
  Hamilton Memorial Prize selection committee 2011, 2013. Jones Medal selection committee 2016.

OTHER PROFESSIONAL SERVICE:

- *Advances in Modal Logic* (AiML), member of the Steering Committee and Programme Committee of this biennial international conference and book series, 2006 –2014
- *Topology Algebra and Categories in Logic* (TACL), member of the Steering and Programme Committees of this biennial international conference series, 2007 – 2019
- *Algebraic Methodology and Software Technology*, Programme Committee 2008 (Canada), 2010 (USA).
- *Trends in Logic VI : Logic and the foundations of physics: space, time and quanta*, Programme Committee, 2008 (Belgium).
- *Workshop on Logic, Language, Information and Computation* (WoLLIC'2007) Brazil, Programme Committee.
- *Marsden Fund*, Mathematical and Information Sciences Assessment Panel - member 1995-6, Convener 1998-2001.
- *NZ Journal of Mathematics*, Management Committee 1991-2018.

SOME INVITED ADDRESSES

• 1992 European Summer Meeting of Association for Symbolic Logic, Vesprem, Hungary
• Alan Day Memorial Algebra Conference, McMaster University, Canada, 1992
• Workshop on Bisimulation, Centrum voor Wiskunde en Informatica, Amsterdam 1994
• WOFACS'94 (Formal Aspects of Computer Science), Cape Town, South Africa 1994
• 10th International Congress for Logic, Methodology and the Philosophy of Science, Florence, Italy, 1995
• 7th Scandinavian Logic Symposium, Uppsala, Sweden, 1996.
• 24th New Zealand Mathematics Colloquium, Victoria University, July 1998
• 8th Asian International Conference in Mathematical Logic, Chongqing, China, August 2002
• Advances in Modal Logic 2002, Toulouse, France, October 2002
• Trends in Logic: 50 Years of Studia Logica, Copenhagen, Denmark, November 2003.
• Algebraic and Topological Methods in Non-Classical Logics, Barcelona, Spain, June 2005.
• Towards Mathematical Philosophy, Torun, Poland, September 2006.
• Universal Structures in Mathematics and Computing, ANU Canberra, January 2007.
• Workshop on Coalgebraic Logic, Oxford, August 2007.
• British Logic Colloquium, London, September 2007.
• Logic, Language, Mathematics. Budapest, Hungary, September 2009 (The Keynote speaker).
• Conference on Mathematical Logic and Set Theory, Chennai, India, August 2010 (Keynote speaker).
• Conference on Non-classical Modal and Predicate Logics, Guangzhou China, December 2011.
• Second Taiwan Philosophical Logic Colloquium (TPLC 2014), Taipei, October 2014. (Keynote speaker).
• ASL European Summer Meeting (Logic Colloquium 2016), Leeds, August 2016.
• Joint Conference of the 3rd Asian Workshop on Philosophical Logic & the 3rd Taiwan Philosophical Logic Colloquium (AWPL-TPLC 2016), Taipei, October 2016. (Keynote speaker).
• Advances in Modal Logic 2018, Bern, Switzerland, August 2018.
• 34th European Summer School in Logic, Language and Information, Workshop on First-order Modal and Temporal Logics, Ljubljana, Slovenia, August 2023 (by internet).

PUBLICATIONS

BOOKS

1. *Topoi : The Categorial Analysis of Logic*
Studies in Logic, **98**, North-Holland Publishing Co., Amsterdam

   • First Edition, 1979, xv + 486pp.
   • Revised Edition (expanded), 1984, xvi + 551pp.
   • Second printing of Revised Edition, 1986.
   • ТОПОСЫ (Russian) [Topoi]. Translation of first edition by V.N. Grishin and V.V. Shokurov. Translation edited, and with a preface, by D.A. Bochvar, 'Mir', Moscow, 1983, 488pp.
   • Internet edition in the *Cornell University Library Historical Mathematics Monographs Collection*, 2002. http://historical.library.cornell.edu/math.
   • Dover Publications reprint, 2006
   • Project Euclid edition https://projecteuclid.org/euclid.bia/1403013939 2014

2. *Axiomatising The Logic of Computer Programming*
Lecture Notes in Computer Science **130**, Springer-Verlag, 1982, xi + 304pp.

3. *Logics of Time and Computation*
CSLI Lecture Notes Number 7, Center for the Study of Language and Information, Stanford University. Distributed by University of Chicago Press.

   • First Edition, x + 133 pp, 1987.
   • Second printing of First Edition, 1988
   • Second Edition, Revised and Expanded, 1992, x + 180pp.

4. *Orthogonality and Spacetime Geometry*
Universitext, Springer-Verlag, New York, 1987, x + 190pp.

5. *Mathematics of Modality*
CSLI Lecture Notes Number 43, Center for the Study of Language and Information, Stanford University. Distributed by University of Chicago Press, 1993, vi + 273 pp.

6. *Lectures on the Hyperreals: An Introduction to Nonstandard Analysis.*
Graduate Texts in Mathematics **188**, Springer-Verlag, New York, 1998. xiv + 289pp. Reprinted by World Publishing Corporation, China, 2011.

7. *Quantifiers, Propositions and Identity*: *Admissible Semantics for Quantified Modal and Substructural Logics*. Lecture Notes in Logic No. 38. Cambridge University Press and the Association for Symbolic Logic, 2011. xiv+268pp.

EDITED COLLECTIONS

1. Festschrift for Max Cresswell on the occasion of his 65th birthday, edited by T. Forster, R. Goldblatt and K. Segerberg. *Logique et Analyse*, no. 181, 2003. (Published October 2004)

2. Special Issue, New Zealand Institute of Mathematics and Its Applications: Logic and Computation Programme. Edited by R. Downey and R. Goldblatt. *Annals of Pure and Applied Logic*, vol. 183, Issues 1-3, 2006.

3. *Advances in Modal Logic, Volume 7*. Edited by Carlos Areces and Robert Goldblatt. College Publications, London, 2008, viii + 406pp.

4. *Proceedings of the 12th Asian Logic Conference*. Edited by Rod Downey, Jörg Brendle, Robert Goldblatt and Byunghan Kim, World Scientific, 2013, viii + 337pp.

PAPERS:

1. A model-theoretic study of some systems containing S3. *Zeitschr. f. Math. Logik und Grundlagen d. Math.* **19**, 1973, 75-82.

2. Concerning the proper axiom for S4.04 and some related systems. *Notre Dame Journal of Formal Logic* **14,** 1973, 392-396.

3. A new extension of S4. *Notre Dame Journal of Formal Logic* **14,** 1973, 567-574.

4. A study of Z-Modal systems. *Notre Dame Journal of Formal Logic* **15,** 1974, 289-294.

5. Decidability of some extensions of J. *Zeitschr. f. Math. Logik und Grundlagen d. Math.* **20,** 1974, 203-206.

6. Semantic analysis of orthologic. *Journal of Philosophical Logic* **3,** 1974, 19-35.

7. First-order definability in modal logic. *The Journal of Symbolic Logic* **40,** 1975, 35-40.

8. Solution to a completeness problem of Lemmon and Scott. *Notre Dame Journal of Formal Logic* **16,** 1975, 405-408.

9. The Stone space of an ortholattice. *Bull. London Math. Soc.* **7,** 1975, 45-48.

10. (with Thomason, S.K.) Axiomatic classes in propositional modal logic. In *Algebra and Logic*, ed. by J.N. Crossley, Lecture Notes in Mathematics **450,** Springer-Verlag, 1975, 163-173.

11. Metamathematics of modal logic, Part I. *Reports on Mathematical Logic* **6,** 41-77, (Polish Scientific Publishers, Warsaw - Cracow, 1976).

12. Metamathematics of modal logic, Part II. *Reports on Mathematical Logic* **7,** 21-52, 1976.

13. Arithmetical necessity, provability and intuitionistic logic, *Theoria* **44,** 1978, 38-46.

14. Diodorean modality in Minkowski spacetime, *Studia Logica* **39,** 1980, 219-236.

15. "Locally at" as a topological quantifier-former, in *Aspects of Philosophical Logic,* U. Monnich (ed.), D. Reidel Publishing Co., 1981, 119-127.

16. Grothendieck topology as geometric modality, *Zeitschr. f. Math. Logik und Grundlagen d. Math* **27,** 1981, 495-529.

17. The semantics of Hoare's iteration rule, *Studia Logica* **41,** 1982, 141-158.

18. Orthomodularity is not elementary, *The Journal of Symbolic Logic* **49,** 1984, 401-404.

19. An abstract setting for Henkin proofs, *Topoi* **3,** 1984, 37-41.

20. On the role of the Baire Category Theorem in the foundations of logic, *The Journal of Symbolic Logic* **50,** 1985, 412-422.

21. An algebraic study of well-foundedness, *Studia Logica* **44,** 1985, 423-437.

22. Varieties of complex algebras, *Annals of Pure and Applied Logic,* **44**, 1989, 173-242.

23. First-Order Spacetime Geometry. In *Logic, Methodology, and Philosophy of Science VIII,* J.E. Fenstad et al. (eds.), Studies in Logic, **126**, North-Holland Publishing Co., 1989, 303-316.

24. On closure under canonical embedding algebras. In *Algebraic Logic,* H. Andreka, J.D. Monk, and I. Nemeti (eds.), Colloquia Mathematica Societatis Janos Bolyai, **54**, North-Holland Publishing Co., Amsterdam, 1991, 217-229.

25. The McKinsey axiom is not canonical, *The Journal of Symbolic Logic,* **56**, 1991, 554-562.

26. Parallel action: concurrent dynamic logic with independent modalities, *Studia Logica,* **51**, 1992, 551-578.

27. Elementary generation and canonicity for varieties of Boolean algebras with operators, *Algebra Universalis,* **34**, 1995, 551-607.

28. Saturation and the Hennessy-Milner Property. In *Modal Logic and Process Algebra*, edited by Alban Ponse, Maarten de Rijke, and YdeVenema. CSLI Lecture Notes No. 53, Stanford: CSLI Publications, 1995, pp 107-129. Distributed by Cambridge University Press.

29. Modal Logics of Programs, *South African Computer Journal*, Number 13, April 1995, 14 - 44.

30. Boolean algebras with operators, *Encyclopaedia of Mathematics, Supplement I,* ed. M. Hazewinkel, Kluwer Academic Publishers, 1997, 143-144.

31. The functional lambda abstraction algebras form a variety. In D.S. Bridges et. al. eds., *Combinatorics, Complexity and Logic: Proceedings of DMTCS'96* (First Conference of the Centre for Discrete Mathematics and Theoretical Computer Science, Auckland, New Zealand, December 1996). Springer-Verlag Singapore, 1997, 226--243.

32. (with Hajnal Andreka and Istvan Nemeti) Relativised quantification: some canonical varieties of sequence-set algebras. *The Journal of Symbolic Logic,* **63**, 1998, 163-184.

33. Enlargements of functional algebras for the lambda calculus, *Theoretical Computer Science,* **198**, 1998, 177-200.

34. (with Antonino Salibra) A finite equational axiomatisation of the functional algebras for the lambda calculus. *Information and Computation*, **148**, 1999, 71-130.

35. Reflections on a proof of elementarity. In *JFAK. Essays Dedicated to Johan van Benthem on the Occasion of his 50th Birthday*, edited by J. Gerbrandy, M. Marx, M. de Rijke, and Y. Venema. Vossiuspers, Amsterdam University Press, 1999, www.illc.uva.nl/j50

36. Algebraic Polymodal Logic: A Survey. *Logic Journal of the IGPL*, **8**(4), July 2000, 393-450.

37. Quasi-Modal Equivalence of Canonical Structures, *The Journal of Symbolic Logic,* **66**, 2001, 497-508.

38. What is the Coalgebraic Analogue of Birkhoff's Variety Theorem? *Theoretical Computer Science,* **266**, 2001, 853-886.

39. Duality for Some Categories of Coalgebras, *Algebra Universalis*, **46**, 2001, 389-416.

40. A Calculus of Terms for Coalgebras of Polynomial Functors. In *Coalgebraic Methods in Computer Science: CMCS'01*, Electronic Notes in Theoretical Computer Science, volume 44, No. 1, 2001, 161-184.

41. Persistence and Atomic Generation for Varieties of Boolean Algebras with Operators, *Studia Logica*, **68**, 2001, 155-171.

42. Mathematical Modal Logic: A View of its Evolution. *Journal of Applied Logic*, vol **1**, nos. 5-6, 2003, pp 309-392.

43. Equational Logic of Polynomial Coalgebras, *Advances in Modal Logic*, *volume 4***,** Philippe Balbiani, Nobu-Yuki Suzuki, Frank Wolter, and Michael Zakharyaschev, editors. King's College Publications, King's College London, 2003, 149-184.

44. Observational Ultrapowers for Polynomial Coalgebras. *Annals of Pure and Applied Logic*, **123**, 2003, 235-290.

45. Enlargements of Polynomial Coalgebras. *Proceedings of the 7th and 8th Asian Logic Conferences*, R. Downey et al. (editors), World Scientific, 2003, 152-192.

46. Questions of Canonicity. In *Trends in Logic – 50 Years of Studia Logica,* Vincent F. Hendricks and Jacek Malinowski (eds), Kluwer Academic Publishers, 2003, pp 93 – 128.

47. A Compactification of Polynomial Coalgebras. *Topology Proceedings*, **27** no. 2, 2003, pp. 439—459.

48. (with Ian Hodkinson and Yde Venema) Erdos Graphs Resolve Fine's Canonicity Problem. *The Bulletin of Symbolic Logic*, vol 10, no. 2, 2004, pp 186—208.

49. (with Ian Hodkinson and Yde Venema) On Canonical Modal Logics That Are Not Elementarily Determined. *Logique et Analyse*, no. 181, 2003, 77–101. Published October 2004.

50. A Comonadic Account of Behavioural Covarieties, *Mathematical Structures in Computer Science*, vol. 15, no. 2, 2005, 243-269.

51. Covarieties of Coalgebras: Comonads and Coequations (with Ranald Clouston). In *Theoretical Aspects of Computing - ICTAC 2005*, Dang Van Hung and Martin Wirsing (eds.), Lecture Notes in Computer Science vol. 3722, pp 301-315. Springer, 2005.

52. Axiomatic Classes of Intuitionistic Models. *Journal of Universal Computer Science*, Vol. 11, Issue 12, pp 1945-1962, 2005.

53. Final Coalgebras and the Hennessy-Milner Property. *Annals of Pure and Applied Logic*, vol. 183, pp 77-93, March 2006.

54. (with Edwin D. Mares) An Alternative Semantics for Quantified Relevant Logic. *The Journal of Symbolic Logic*, vol. 71, no. 1, pp. 163-187, 2006.

55. Maps and Monads for Modal Frames. *Studia Logica*, vol. 83, 2006, 309-331.

56. Constant Modal Logics and Canonicity. In *Modality Matters. Twenty-Five Essays in Honour of Krister Segerberg*, edited by Henrik Lagerlund and Sten Lindström and Rysiek Sliwinski. Uppsala Philosophical Studies 53, Uppsala University, 2006, 149-157.

57. Mathematical Modal Logic: A View of its Evolution. In *Logic & the Modalities in the Twentieth Century*, Volume 7 of the *Handbook of the History of Logic*, edited by Dov M. Gabbay and John Woods, Elsevier, 2006, 1-98.
(Revised and expanded version of paper [42])

58. (with David Friggens) A Modal Proof Theory for Polynomial Coalgebras. *Theoretical Computer Science*, vol. 360, Issues 1-3, 2006, pp 1-22.

59. A Kripke-Joyal Semantics for Noncommutative Logic in Quantales. In *Advances in Modal Logic, volume 6*, Guido Governatori, Ian Hodkinson and Yde Venema, editors. College Publications, London, 2006, 209-225.

60. (with Edwin D. Mares) A General Semantics for Quantified Modal Logic. In *Advances in Modal Logic, volume 6*, Guido Governatori, Ian Hodkinson and Yde Venema, editors. College Publications, London, 2006, 227-246.

61. (with Ian Hodkinson) The McKinsey-Lemmon Logic Is Barely Canonical. *Australasian Journal of Logic,* vol. 5, 2007, pp. 1-19.

62. (with Ian Hodkinson) Commutativity of Quantifiers in Varying-Domain Kripke Models. In *Towards Mathematical Philosophy,* Volume 28 of *Trends in Logic*, edited by David Makinson, Jacek Malinowski and Heinrich Wansing, Springer, 2009, 9-30.

63. Conservativity of Heyting Implication Over Relevant Quantification. *The Review of Symbolic Logic*, vol. 2, no. 2, 2009, pp. 310- 341. doi:10.1017/S1755020309090194 .

64. (with Michael Kane) An Admissible Semantics for Propositionally Quantified Relevant Logics. *Journal of Philosophical Logic,* vol. 39, no. 1, 2010, pp. 73–100. Published on-line 5 August 2009, doi:10.1007/s10992-009-9109-7.

65. (with Galym Akishev) Monadic Bounded Algebras. *Studia Logica*, vol. 96, no. 1, October 2010, pp. 1-40. doi: 10.1007/s11225-010-9269-z.

66. Functional Monadic Bounded Algebras. *Studia Logica*, vol. 96, no. 1, October 2010, pp. 41-48. doi: 10.1007/s11225-010-9271-5.

67. Deduction Systems for Coalgebras Over Measurable Spaces. *Journal of Logic and Computation*, vol. 20, Issue 5, October 2010, pp. 1069-1100. Published online December 12, 2008, doi: 10.1093/logcom/exn092.

68. Cover Semantics for Quantified Lax Logic. *Journal of Logic and Computation*, vol. 21, Issue 6, December 2011, pp.1035-1063. Published online 11 August 2010; doi: 10.1093/logcom/exq029.

69. Grishin Algebras and Cover Systems for Classical Bilinear Logic. *Studia Logica*, vol. 99, nos. 1-3, October 2011, pp. 203-227. Published online 31 August 2011, doi:10.1007/s11225-011-9360-0.

70. Topological Proofs of Some Rasiowa-Sikorski Lemmas. *Studia Logica,* vol. 100, nos. 1-2, April 2012, pp. 175-191. doi: 10.1007/s11225-012-9374-2.

71. (with Marcel Jackson) Well Structured Program Equivalence is Highly Undecidable. *ACM Transactions on Computational Logic*, Volume 13 Issue 3, Article 26, August 2012, 8 pages. doi:10.1145/2287718.2287726.

72. (with Tomasz Kowalski) The Power of a Propositional Constant. *Journal of Philosophical Logic*, Volume 43, Issue 1, February 2014, pp. 133-152. doi:10.1007/s10992-012-9256-0.

73. Equivalent Beliefs in Dynamic Doxastic Logic. In *Krister Segerberg on Logic of Actions*, edited by Robert Trypuz, Springer, 2014, pp. 179–207. doi: 10.1007/978-94-007-7046-1_9

74. The Countable Henkin Principle. In *The Life and Work of Leon Henkin: Essays on His Contributions*, edited by Maria Manzano, Ildiko Sain and Enrique Alonso, Springer 2014, pp. 179-201. doi 10.1007/978-3-319-09719-0_13

75. Ultraproducts of Admissible Models for Quantified Modal Logic. In *Structural Analysis of Non-Classical Logics*, edited by Duen-Min Deng, Syraya Chin-Mu Yang and Hanti Lin, Springer, 2015, pp. 17-36. doi 10.1007/978-3-662-48357-2_2

76. (with Matt Grice) Mereocompactness and Duality for Mereotopological Spaces. In *J. Michael Dunn on Information Based Logics*, edited by Katalin Bimbo, Springer, 2016, pp. 313-330. doi 10.1007/978-3-319-29300-4_15

77. (with Ian Hodkinson) The Tangled Derivative Logic of the Real Line and Zero-Dimensional Spaces. In *Advances in Modal Logic, Volume 11*, Lev Beklemishev, Stéphane Demri and András Máté, editors. College Publications, 2016, pp. 342-361. www.aiml.net/volumes/volume11

78. (with Ian Hodkinson) Spatial logic of tangled closure operators and modal mu-calculus. *Annals of Pure and Applied Logic*, Volume 168, Issue 5, May 2017, pp. 1032-1090, available online 21 November 2016. Open access at https://doi.org/10.1016/j.apal.2016.11.006

79. (with Ian Hodkinson) Tangled Closure Algebras. *Categories and General Algebraic Structures with Applications,* Volume 7, 2017, pp. 9-31, http://cgasa.ir/volume_5757.html

80. (with Ian Hodkinson) The Finite Model Property for Logics with the Tangle Modality. *Studia Logica,* Volume 106, Issue 1, February 2018, pp. 131-166, available on-line 1 June 2017. Open access at https://doi.org/10.1007/s11225-017-9732-1

81. Representing and Completing Lattices by Propositions of Cover Systems. In *Philosophical Logic: Current Trends in Asia,* edited by Syraya Chin-Mu Yang, Kok Yong Lee and Hiroakira Ono, Springer, 2017, pp. 1-18. https://doi.org/10.1007/978-981-10-6355-8_1

82. Canonical Extensions and Ultraproducts of Polarities. *Algebra Universalis*, Volume 79, Issue 4, Article 80, 2018. Available online 8 October 2018. https://doi.org/10.1007/s00012-018-0562-4

83. (with Ian Hodkinson) Strong completeness of modal logics over 0-dimensional metric spaces. *The Review of Symbolic Logic,* Volume 13, Issue 3, September 2020, pp. 611-632*,* published online 24 October 2019. https://doi.org/10.1017/S1755020319000534

84. Definable Operators on Stable Set Lattices. *Studia Logica*, Volume 108, Issue 6, December 2020, pp. 1263-1280, published online 5 February 2020. https://doi.org/10.1007/s11225-020-09896-0

85. Fine's Theorem on First-Order Complete Modal Logics. In *Metaphysics, Meaning and Modality. Themes from Kit Fine*, edited by Mircea Dumitru, Oxford University Press 2020, pp. 316-334. https://doi.org/10.1093/oso/9780199652624.003.0017

86. Morphisms and Duality for Polarities and Lattices with Operators. *Journal of Applied Logics – IfCoLog Journal of Logics and their Applications*, Volume 7, no. 6, December 2020, pp. 1019 – 1072. Open access at https://www.collegepublications.co.uk/ifcolog/?00042
Reprinted in *Selected Topics from Contemporary Logics,* edited by Melvin Fitting, College Publications, London, 2021, pp. 247-299.

87. Completeness of Pledger's Modal Logics of One-Sorted Projective and Elliptic Planes. *Australasian Journal of Logic*, Volume 18, Number 4, 2021, pp. 106 – 131. Open access at https://doi.org/10.26686/ajl.v18i4.6829

88. Modal Logics that Bound the Circumference of Transitive Frames. In *Hajnal Andréka and István Németi on Unity of Science: From Computing to Relativity Theory Through Algebraic Logic*, edited by Judit Madarász and Gergely Székely, Springer, 2021, pp. 233-265. https://doi.org/10.1007/978-3-030-64187-0_10

89. Modal Logics of Some Hereditarily Irresolvable Spaces. In *Alasdair Urquhart on Nonclassical and Algebraic Logic and Complexity of Proofs*, edited by I. Duntsch and E. Mares, Springer, 2022, pp. 303-322. https://doi.org/10.1007/978-3-030-71430-7_11

90. Cover Systems for the Modalities of Linear Logic. In *Hiroakira Ono on Residuated Lattices and Substructural Logics,* edited by N. Galatos and K. Terui, Springer, 2022, pp. 299-318. https://doi.org/10.1007/978-3-030-76920-8_8

91. (with Ian Hodkinson) Canonicity in Power and Modal Logics of Finite Achronal Width. *The Review of Symbolic Logic*, Volume 17, Issue 3, September 2024, pp 705-735. Published online 22 March 2023. https://doi.org/10.1017/S1755020323000060

92. Strong Completeness of a First-Order Temporal Logic for Real Time. *The Review of Symbolic Logic*, published online 22 May 2024. https://doi.org/10.1017/S1755020324000121

Other Items

- Review of *Model Theory for Modal Logic*, by Kenneth A. Bowen. *The Journal of Symbolic Logic*, Volume 46, no. 2, June 1981, pp. 415-417.

- Review of papers in Propositional Dynamic Logic. *The Journal of Symbolic Logic*, Volume 51, no. 1, March 1986, pp. 225-227.

- Cameo of a Consummate Computabilist. In *Computability and Complexity: Essays Dedicated to Rodney G. Downey on the Occasion of His 60th Birthday,* Adam Day et al. (Eds), Lecture Notes in Computer Science 10010, pp. 3-8, Springer, 2017, https://doi.org/10.1007/978-3-319-50062-1_1

PhD SUPERVISION

Keith Daynes, *Universals as generalized sets*, 1985.
Galym Akishev, *Monadic bounded algebras*, 2009.
David Gilbert, *A Two-Dimensional Approach to Modal Logics Containing an Actuality Operator*, 2012.

MASTERS THESIS SUPERVISION

Michael Brockway, *Topoi and logic*, 1976.
Steven Geraghty, *An introduction to stack algebras*, 1979.
Kathleen Spencer, *A sheaf of real numbers*, 1981.
Mark Kortink, *Command algebra*, 1983.
James Neyland, *Defining algebraic elements*, 1983.
Susan Kelly, *Characterisations of Lorentz transformations*, 1985.
Stephen Binns, *The effective topos*, 1998.
David Friggens, *A modal proof theory for polynomial coalgebras*, 2004.
Ranald Clouston, *Comonads, coequations and behavioural covarieties*, 2004.
Michael Kane, *A sound and complete semantics for propositionally quantified relevant logics*, 2008.
Timothy Makarios, *A mechanical verification of the independence of Tarski's Euclidean axiom*, 2012.