

Curriculum Vitae

DOMINIC VERITY

Centre of Australian Category Theory
School of Mathematical and Physical Sciences
Faculty of Science and Engineering
Macquarie University, Sydney, NSW 2109, Australia



Email: dominic.verity@mq.edu.au

Homepage: <http://dom-verity.github.io>

ORCID: <https://orcid.org/0000-0002-4137-6982>

URL: <https://researchers.mq.edu.au/en/persons/dominic-verity>

Current position

Emeritus Professor of Pure Mathematics, Macquarie University

Areas of research interest

Higher Category Theory • Homotopy Theory • Programming Languages

APPOINTMENTS HELD

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| 2020-2021 | <i>Professor of Pure Mathematics</i> , Department of Mathematics and Statistics, Faculty of Science and Engineering, Macquarie University, Australia |
| 2012-2020 | <i>Professor of Computing</i> , Department of Computing, Faculty of Science and Engineering, Macquarie University, Australia |
| 2013-2017 | <i>Chair of Academic Senate</i> , Vice-Chancellor's Office, Macquarie University, Australia |
| 2001-2007 | <i>Director of Postgraduate Programs</i> , Division of ICS, Macquarie University, Australia |
| 2001-2012 | <i>Associate Professor</i> , Department of Computing, Macquarie University, Australia |
| 2000-2001 | <i>Senior Lecturer</i> , Department of Computing, Macquarie University, Australia |
| 1999-2000 | <i>Director and Lead Consultant</i> , Categorical Solutions Pty. Ltd., Sydney, Australia |
| 1996-1999 | <i>Head of Equity Derivative Trading</i> , HSBC James Capel, Sydney, Australia |
| 1995-1996 | <i>Senior Quantitative Analyst</i> , Equity Derivatives Trading, Deutsche Bank, Sydney, Australia |
| 1993-1995 | <i>Consultant Quantitative Analyst</i> , Bain and Company, Deutsche Bank, Sydney, Australia |
| 1993-1995 | <i>Lecturer</i> , Department of Mathematics, Macquarie University, Australia |
| 1992-1993 | <i>Research Fellow</i> , Department of Mathematics, Macquarie University, Australia |
| 1991-1992 | <i>Research Fellow</i> , Department of Pure Maths and Mathematical Statistics, Cambridge University, UK |
| 1983-1984 | <i>Computer Engineer</i> , BBC World Service, Bush House, London, UK |
| 1981-1983 | <i>Computer Programmer</i> , Acorn Computers Limited (now ARM Limited), Cambridge, UK |

EDUCATION

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| 1988-1992 | <i>PhD in Mathematics</i> , Fitzwilliam College, Cambridge University, UK |
| 1987-1988 | <i>Part III Mathematics</i> , awarded with Distinction, Fitzwilliam College, Cambridge University, UK |
| 1984-1987 | <i>BSc (Hons) Mathematics</i> , Double 1 st Class, Fitzwilliam College, Cambridge University, UK |

RECENT AWARDS, INVITATIONS & HONORARY APPOINTMENTS

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| 2020, 2022 | <i>Research Professor and Program Organiser</i> , Mathematical Sciences Research Institute (MSRI) program “Higher Categories and Categorification”, Berkeley (CA) USA. |
| 2019 | <i>Visiting Research Fellow</i> , Dept. of Mathematics, Johns Hopkins University, Baltimore (MD) USA |
| 2018 | <i>Invited Mentor</i> , Mass. Institute of Technology, Talbot Workshop , Course title: “Model-independent theory of ∞ -Categories”, Portland (OR) USA |

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| 2017 | <i>Invited Lecturer</i> , AMSI Summer School 2017, Course title: “ <i>Category Theory and Computer Science</i> ”, Sydney University, Australia. |
| 2016 | <i>Visiting Professor</i> , Dept. of Mathematics and Mathematical Statistics, Cambridge University, UK |
| 2016 | <i>Visiting Research Fellow</i> , Max Planck Institute for Mathematics, Bonn, Germany |
| 2015,2016 | <i>Visiting Research Fellow</i> , Dept. of Mathematics, Johns Hopkins University, Baltimore MD, USA |
| 2012-2015 | <i>Associate in Mathematics</i> , Dept. of Mathematics, Harvard University, Cambridge MA, US (various separate appointments) |
| 2011 | <i>Invited Participant</i> , Mathematisches Forschungsinstitut Oberwolfach, Mini-workshop: “ <i>The homotopy interpretation of constructive type theory</i> ”, Germany |
| 2011 | <i>National Citation for Outstanding Contribution to Student Learning</i> , Australian Learning and Teaching Council (ALTC), “ <i>For a decade of inspirational and innovative educational leadership in the field of Information Technology</i> ” |
| 2009 | <i>Vice Chancellor’s Award for Teaching Excellence</i> , Macquarie University, “ <i>For leadership and development of postgraduate and professional development programs in Information Technology</i> ” |
| 2006 and 2009 | <i>Visiting Research Fellow</i> , Fitzwilliam College and <i>Visiting Professor</i> , Department of Pure Mathematics and Mathematical Statistics, Cambridge University, UK |

EXTERNALLY FUNDED GRANTS

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| 2019-2022 | (with R. Street, S. Lack & R. Garner) Australian Research Council, Discovery Project DP190102432 , “ <i>Working synthetically in higher categorical structures</i> ”, AU\$453,000 |
| 2016–2018 | (with R. Street, S. Lack & R. Garner) Australian Research Council, Discovery Project DP160101519 , “ <i>Monoidal categories and beyond: new contexts and new applications</i> ”, AU\$580,900 |
| 2015–2018 | (with M. Hillier, A. Fluck et. al.) Australian Government Office of Learning and Teaching, “ <i>Transforming exams across Australia: processes and platform for e-exams in high stakes, supervised environments</i> ”, AU\$500,000 |
| 2013-2015 | (with R. Street, S. Lack & R. Garner) Australian Research Council, Discovery Project DP130101969 , “ <i>Structural homotopy theory: a category-theoretic study</i> ”, AU\$600,000 |
| 2010-2012 | (with R. Street, M. Johnson & S. Lack) Australian Research Council, Discovery Project DP1094883 , “ <i>Applicable Categorical Structures</i> ”. AU\$290,000 |
| 2007-2009 | (with R. Street, M. Johnson & S. Lack) Australian Research Council, Discovery Project DP0771252 , “ <i>Cohomology enhanced: an application of enriched and higher categories</i> ”. AU\$276,000 |

PHD STUDENTS

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| 2021 ongoing | (with S. Lack) David Farrell, “ <i>Model independent fibred ∞-category theory</i> ” |
| 2021 ongoing | (with R. Garner) Yao Tang, “ <i>Higher categories and dependently typed logics</i> ” |
| 2020 ongoing | (with S. Lack) Nicola Di Vittorio, “ <i>Higher derivators as a foundation for ∞-category theory</i> ” |
| 2018 ongoing | (with R. Garner) Paula Verdugo, “ <i>Synthetic ∞-category theory</i> ” |
| 2020 awarded | (with R. Street) Yuki Maehara, “ <i>The Gray tensor product for 2-quasi-categories</i> ”, Vice-Chancellor’s Medal for Excellence |
| 2018 awarded | (with R. Garner) Edoardo Lanari, “ <i>Cylinder objects for Grothendieck-Maltsiniotis ∞-groupoids</i> ” |
| 2015 awarded | (with R. Garner) Mitchell Buckley, “ <i>Three studies in higher category theory: fibrations, skew monoidal structures and excision of extremals</i> ” |
| 2015 awarded | (with R. Garner) Matthew Burke, “ <i>Synthetic Lie Theory</i> ” |
| 2012 awarded | (with R. Street) Thomas Booker, “ <i>Generalized and particular monoidal categories, and structures therein</i> ” |
| 2012 awarded | (with R. Street) David Oury, “ <i>Duality for Joyal’s category Θ and homotopy concepts for Θ-sets</i> ” |
| 2011 awarded | (with M. Johnson) Micah McCurdy, “ <i>Cyclic $*$-autonomous categories and the Tannaka adjunction via graphical methods</i> ” |
| 2011 awarded | (with A. Sloane) Matthew Roberts, “ <i>Compiled generics for functional programming languages</i> ” |
| 2010 awarded | (with P. Watters) Wai Han Ho, “ <i>On the evaluation of face identification systems</i> ” |
| 2007 awarded | (with A. Sloane) Ekaterina Stefanov, “ <i>Simple code compression and customisation for bytecode for interpreters</i> ” |

PUBLICATIONS & TALKS

Books and memoirs

- 2022- (with E. Riehl) MORE ELEMENTS OF ∞ -CATEGORY THEORY, <https://emilyriehl.github.io/files/more-elements.pdf>, book draft under development.
- 2022 (with E. Riehl) THE ELEMENTS OF ∞ -CATEGORY THEORY, volume 194 of *Cambridge Studies in Advanced Mathematics*, Cambridge University Press, frontmatter i–xx, pages 1–760. (online publication January 2022)
- 2011 ENRICHED CATEGORIES, INTERNAL CATEGORIES AND CHANGE OF BASE, *Reprints in Theory and Application of Categories*, 20:1–266
- 2008 COMPLICIAL SETS, CHARACTERISING THE SIMPLICIAL NERVES OF STRICT Ω -CATEGORIES, volume 193 of *Memoirs of the AMS*. American Mathematical Society

Selected articles and preprints

- 2021 (with E. Riehl, submitted) CARTESIAN EXPONENTIATION AND MONADICITY, <https://arxiv.org/abs/2108.11786>, 1–71, submitted to *Cahiers de Topologie et Géométrie Différentielle Catégoriques*.
- 2021 (with M. Rovelli and V. Ozornova, submitted) GRAY TENSOR PRODUCTS AND SATURATED N -COMPLICIAL SETS, <https://arxiv.org/abs/2007.01235>, submitted to *Higher Structures*.
- 2020a (with E. Riehl) ON THE CONSTRUCTION OF LIMITS AND COLIMITS IN ∞ -CATEGORIES THEORY AND APPLICATIONS OF CATEGORIES, 35 (2020), 1101–1158.
- 2020b (with E. Riehl) INFINITY CATEGORY THEORY FROM SCRATCH, *Higher Structures*, 4(1) (2020), 115–167. (invited publication)
- 2020c (with E. Riehl) RECOGNIZING QUASI-CATEGORICAL LIMITS AND COLIMITS IN HOMOTOPY COHERENT NERVES, *Applied Categorical Structures*, 28 (2020), 669–716.
- 2018 (with E. Riehl) THE COMPREHENSION CONSTRUCTION, *Higher Structures*, 2(1) (2018), 116–190.
- 2017b (with E. Riehl) KAN EXTENSIONS AND THE CALCULUS OF MODULES FOR ∞ -CATEGORIES, *Algebraic and Geometric Topology*, 17-1 (2017) 189–271.
- 2017a (with E. Riehl) FIBRATIONS AND YONEDA’S LEMMA IN AN ∞ -COSMOS, *Journal of Pure and Applied Algebra*, 221(3) (2017) 499–564.
- 2016a (with E. Riehl) HOMOTOPY COHERENT ADJUNCTIONS AND THE FORMAL THEORY OF MONADS. *Advances in Mathematics*, 286:802–888
- 2015b (with E. Riehl) THE 2-CATEGORY THEORY OF QUASI-CATEGORIES. *Advances in Mathematics*, 280:549–642
- 2015a (with E. Riehl) COMPLETENESS RESULTS FOR QUASI-CATEGORIES OF ALGEBRAS, HOMOTOPY LIMITS, AND RELATED GENERAL CONSTRUCTIONS. *Homology, Homotopy and Applications*, 17(1):1–33
- 2014 (with E. Riehl) THE THEORY AND PRACTICE OF REEDY CATEGORIES. *Theory and Applications of Categories*, 29(9):256–301
- 2010 (with R. Street) THE COMPREHENSIVE FACTORISATION AND TORSORS. *Theory and Application of Categories*, 23(3):42–75
- 2008 WEAK COMPLICIAL SETS I, BASIC HOMOTOPY THEORY. *Advances in Mathematics*, 219:1081–1149
- 2007 WEAK COMPLICIAL SETS II, NERVES OF COMPLICIAL GRAY-CATEGORIES. In A. Davydov et al., editors, *Categories in Algebra, Geometry and Mathematical Physics (StreetFest)*, volume 431 of *Contemporary Mathematics*, pages 441–467. American Mathematical Society.
- 1995 (with A. Joyal & R. H. Street) TRACED MONOIDAL CATEGORIES, *Mathematical Proceedings of the Cambridge Philosophical Society*, 119(3):425–446

Invited Keynotes, Courses and Plenaries

- 2020 INVITED MINI-COURSE, HIGHER CATEGORIES AND CATEGORIFICATION, Mathematical Sciences Research Institute, Berkeley (CA) USA, “*Synthetic ∞ -category theory*”.
- 2019 INVITED MINI-COURSE, FOUNDATIONAL METHODS IN COMPUTER SCIENCE, University of Calgary, Calgary Canada, “*Synthetic ∞ -category theory*”.
- 2019 INVITED SPEAKER, TERCER COLOQUIO DE CATEGORÍAS, ÁLGEBRA Y TEMAS AFINES, UNAM Oaxaca Mexico, “*Synthetic ∞ -category theory and ∞ -cosmology*”

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| 2018 | INVITED SPEAKER, DIAGRAMMATIC REASONING IN HIGHER EDUCATION, University of Newcastle, <i>"An exploration of String Diagrams in Computer Science"</i> |
| 2018 | INVITED MINI-COURSE, TOPOLOGY IN AUSTRALIA AND SOUTH KOREA (AMSI), POSTECH, Pohang, South Korea, <i>"An introduction to model independent ∞-category theory"</i> |
| 2017 | INVITED SPEAKER, CATEGORIES FOR HOMOTOPY THEORY AND REWRITING, CIRM, Luminy, France, talk entitled <i>"A complicit compendium"</i> |
| 2016 | INVITED SPEAKER, INTERNATIONAL CATEGORY THEORY MEETING (ICTM2016) Dalhousie University, Halifax, Canada, talk entitled <i>"On the Yoga of (Un)straightening"</i> |
| 2016 | INVITED SPEAKER, 31ST SUMMER TOPOLOGY CONFERENCE, University of Leicester, UK, talk entitled <i>"A monadic account of Lurie's (un)straightening construction"</i> |
| 2015 | INVITED SPEAKER, JOHNS HOPKINS TOPOLOGY SEMINAR, Baltimore MD, USA, talk entitled <i>"The Unbearable Lightness of 2-Being"</i> |
| 2015 | PLENARY SPEAKER, INTERNATIONAL CATEGORY THEORY CONFERENCE (CT15), Aveiro, Portugal, talk entitled <i>"The calculus of modules for ∞-categories"</i> |
| 2014 | PLENARY SPEAKER, INTERNATIONAL CATEGORY THEORY CONFERENCE (CT14), Cambridge, UK, talk entitled <i>"The formal theory of $(\infty, 1)$-categories"</i> |
| 2013 | INVITED SPEAKER, HARVARD TOPOLOGY SEMINAR, Cambridge MA, USA, talk entitled <i>"COBORDISMS AND WEAK COMPLICIAL SETS"</i> |
| 2012 | INVITED SPEAKER, MIT TOPOLOGY SEMINAR, Cambridge MA, USA, talk entitled <i>"Homotopy coherent adjunctions and the walking adjunction"</i> |
| 2010 | PLENARY SPEAKER, INTERNATIONAL CATEGORY THEORY CONFERENCE (CT10), Genova, Italy, talk entitled <i>"On the 2-category theory of quasi-categories"</i> |
| 2009 | PLENARY SPEAKER, INTERNATIONAL CATEGORY THEORY CONFERENCE (CT09), Cape Town, South Africa, talk entitled <i>"Weak complicit sets and iterated Segal spaces"</i> |
| 2009 | PLENARY SPEAKER, 88TH PERIPATETIC SEMINAR ON SHEAVES AND LOGIC in Honour of the 60th birthdays of Professors Martin Hyland and Peter Johnstone, University of Cambridge, United Kingdom, talk entitled <i>"On the non-canonicity of complicit stratifications"</i> |
| 2008 | INVITED SPEAKER, AUSTRALIAN NATIONAL UNIVERSITY, Algebra Seminar, Canberra, Australia, talk entitled <i>"Quasi-categories, weak complicit sets and manifolds"</i> |
| 2008 | PLENARY SPEAKER, INTERNATIONAL CATEGORY THEORY CONFERENCE (CT08), Calais, France, talk entitled <i>"Cobordisms and Weak Complicit Sets"</i> |
| 2007 | PLENARY SPEAKER, INTERNATIONAL CATEGORY THEORY CONFERENCE (CT07), Carvoeiro, Portugal, talk entitled <i>"Weak complicit sets and internal quasi-categories"</i> |
| 2006 | KEYNOTE SPEAKER, 50TH ANNIVERSARY MEETING OF THE AUSTRALIAN MATHEMATICAL SOCIETY, Sydney, Australia, talk entitled <i>"Non-abelian cohomology as the raison d'être for higher category theory"</i> |
| 2005 | INVITED SPEAKER, STREETFEST, CONFERENCE AND WORKSHOP IN HONOUR OF ROSS STREET'S 60TH BIRTHDAY, Sydney and Canberra, Australia, talk entitled <i>"A simplicial weak category theory"</i> |

SERVICE

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| 2020- | MEMBER, EMERITUS PROFESSOR PANEL, responsible for making recommendations to Academic Senate regarding the appointment of Emeritus Professors, Macquarie University, Australia. |
| 2017- | MEMBER, ORGANISING COMMITTEE, Mathematical Sciences Research Institute (MSRI) Scientific Program: <i>"Higher Categories and Categorification (2020)"</i> , Berkeley (CA), USA. |
| 2016- | DEPUTY DIRECTOR, CENTRE OF AUSTRALIAN CATEGORY THEORY, Macquarie University, Australia |
| 2020-2021 | MATHEMATICS RESEARCH LEAD, Department of Mathematics and Statistics, Faculty of Science and Engineering, Macquarie University, Australia. |
| 2017-2021 | CHAIR, UNIVERSITY DISCIPLINE COMMITTEE, Macquarie University, Australia, responsible for chairing hearings of all serious student misconduct cases, appointed at the request of the Vice-Chancellor. |
| 2013-2017 | CHAIR OF ACADEMIC SENATE, responsible for leading the academic governing body of Macquarie University, http://senate.mq.edu.au , elected 2012 & 2015 |
| 2013-2016 | MEMBER, UNIVERSITY COUNCIL, the overall governing body of Macquarie University, elected 2012 & 2015 |
| 2013-2016 | MEMBER, UNIVERSITY COUNCIL MANAGEMENT, APPOINTMENTS & AWARDS, REMUNERATION, AND DISCIPLINE COMMITTEES |
| 2011-2016 | ELECTED MEMBER, ACADEMIC SENATE, elected 2010, 2012 & 2014 |

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| 2013 | (with R. Garner & S. Lack) ORGANISER, INTERNATIONAL CATEGORY THEORY CONFERENCE (CT13), Macquarie University, Sydney, Australia |
| 2011-2014 | CHAIR, SENATE LEARNING AND TEACHING COMMITTEE, responsible for leading academic policy development for and oversight of Macquarie University's learning & teaching activities |
| 2011-2015 | MEMBER, MACQUARIE UNIVERSITY TEACHING EXCELLENCE ACADEMY, provide advice to the DVC Provost on all aspects of learning & teaching practice |
| 2011 | ACTING HEAD, DEPARTMENT OF COMPUTING, Macquarie University, Sydney, Australia |
| 2006-2008 | ELECTED MEMBER, ACADEMIC SENATE, elected 2005 |
| 2002-2007 | DIRECTOR, POSTGRADUATE AND PROFESSIONAL DEVELOPMENT PROGRAMS, Division of Information and Communications Sciences, Macquarie University, Sydney |
| 2002-2007 and 2011 | MEMBER, FACULTY EXECUTIVE, Division of Information and Communications Sciences, Macquarie University, Sydney |
| 2003-2007 | MEMBER, SENATE ACADEMIC PROGRAM COMMITTEE (APC) review, approval and quality assurance of all of Macquarie University's coursework programs |
| 2005-2007 | CHAIR, UNDERGRADUATE AND POSTGRADUATE SUB-COMMITTEES OF APC |

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