

# 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



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## Current positions

*Emeritus Professor of Pure Mathematics, Macquarie University*

## Areas of research interest

Higher Category Theory • Homotopy Theory • Programming Languages

## APPOINTMENTS HELD

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
2013-2016	<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

1988-1992	<i>PhD in Mathematics</i> , Fitzwilliam College, Cambridge University, UK. <b>PhD Supervisor:</b> Professor J. M. E. Hyland
1987-1988	<i>Part III Mathematics</i> , awarded with Distinction, Fitzwilliam College, Cambridge University, UK
1984-1987	<i>BSc (Hons) Mathematics</i> , Double 1 <sup>st</sup> Class, Fitzwilliam College, Cambridge University, UK

## RECENT AWARDS, INVITATIONS & HONORARY APPOINTMENTS

2023	<i>PROSE Award winner</i> , Mathematics and Statistics category, Association of American Publishers, for the book <a href="#">THE ELEMENTS OF <math>\infty</math>-CATEGORY THEORY</a>
2021-	<i>Professor Emeritus</i> , Macquarie University, Sydney, Australia, unanimously elected by University Council, 19 <sup>th</sup> August 2021

2022-	Honorary Professor, Mathematical Sciences Institute, Australian National University, Canberra, Australia
2020, 2022	Research Professor and Program Organiser, Mathematical Sciences Research Institute (MSRI) program <i>"Higher Categories and Categorification"</i> , Berkeley (CA) USA.
2019	Visiting Research Fellow, Dept. of Mathematics, Johns Hopkins University, Baltimore (MD) USA
2018	Invited Mentor, Mass. Institute of Technology, <a href="#">Talbot Workshop</a> , Course title: <i>"Model-independent theory of <math>\infty</math>-Categories"</i> , Portland (OR) USA
2017	Invited Lecturer, AMSI Summer School 2017, Course title: <i>"Category Theory and Computer Science"</i> , Sydney University, Australia.
2016	Visiting Professor, Dept. of Mathematics and Mathematical Statistics, Cambridge University, UK
2016	Visiting Research Fellow, Max Planck Institute for Mathematics, Bonn, Germany
2015, 2016	Visiting Research Fellow, Dept. of Mathematics, Johns Hopkins University, Baltimore MD, USA
2012-2015	Associate in Mathematics, Dept. of Mathematics, Harvard University, Cambridge MA, US (various separate appointments)
2011	Invited Participant, Mathematisches Forschungsinstitut Oberwolfach, Mini-workshop: <i>"The homotopy interpretation of constructive type theory"</i> , Germany
2011	National Citation for Outstanding Contribution to Student Learning, Australian Learning and Teaching Council (ALTC), <i>"For a decade of inspirational and innovative educational leadership in the field of Information Technology"</i>
2009	Vice Chancellor's Award for Teaching Excellence, Macquarie University, <i>"For leadership and development of postgraduate and professional development programs in Information Technology"</i>
2006 and 2009	Visiting Research Fellow, Fitzwilliam College and Visiting Professor, Department of Pure Mathematics and Mathematical Statistics, Cambridge University, UK

## EXTERNALLY FUNDED GRANTS

2023-2026	US Army Research Office, BAA Fundamental Science <b>80600-NC-INT</b> , <i>"Towards a synthetic theory of (extended) TQFTs"</i> , AU\$470,000
2019-2022	(with R. Street, S. Lack & R. Garner) Australian Research Council, Discovery Project <b>DP190102432</b> , <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 <b>DP160101519</b> , <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 <b>DP130101969</b> , <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 <b>DP1094883</b> , <i>"Applicable Categorical Structures"</i> . AU\$290,000
2007-2009	(with R. Street, M. Johnson & S. Lack) Australian Research Council, Discovery Project <b>DP0771252</b> , <i>"Cohomology enhanced: an application of enriched and higher categories"</i> . AU\$276,000

## PHD STUDENTS

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 <math>\infty</math>-category theory"</i>
2018 ongoing	(with R. Garner) Paula Verdugo, <i>"Synthetic <math>\infty</math>-category theory"</i>
2020 awarded	(with R. Street) Yuki Machara, <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 <math>\infty</math>-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 <math>\Theta</math> and homotopy concepts for <math>\Theta</math>-sets"</i>
2011 awarded	(with M. Johnson) Micah McCurdy, <i>"Cyclic <math>*</math>-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, "*On the evaluation of face identification systems*"  
**2007 awarded** (with A. Sloane) Ekaterina Stefanov, "*Simple code compression and customisation for bytecode for interpreters*"

## PUBLICATIONS & TALKS

### Books and memoirs

- 2022- (with E. Riehl) MORE ELEMENTS OF  $\infty$ -CATEGORY THEORY, <https://emilyriehl.github.io/files/more-elements.pdf>, book draft under development.
- 2022 (with E. Riehl) THE ELEMENTS OF  $\infty$ -CATEGORY THEORY, volume 194 of *Cambridge Studies in Advanced Mathematics*, Cambridge University Press, frontmatter i–xix, pages 1–759. February 2022. **PROSE Award Winner 2023**, Association of American Publishers, Mathematics and Statistics Category
- 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  $\Omega$ -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*.
- 2023 (with M. Rovelli and V. Ozornova, accepted) GRAY TENSOR PRODUCTS AND SATURATED N-COMPLICIAL SETS, <https://arxiv.org/abs/2007.01235>, *Higher Structures* to appear.
- 2020a (with E. Riehl) ON THE CONSTRUCTION OF LIMITS AND COLIMITS IN  $\infty$ -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  $\infty$ -CATEGORIES, *Algebraic and Geometric Topology*, 17-1 (2017) 189–271.
- 2017a (with E. Riehl) FIBRATIONS AND YONEDA’S LEMMA IN AN  $\infty$ -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

- 2022 [Categories and Companions Symposium](#), MATRIX Institute, University of Melbourne, Australia. “Themes and motivations in  $\infty$ -Cosmology”.
- 2022 [Topos Institute Colloquium](#), Berkeley (CA) USA. “Zen and the Art of  $\infty$ -Categories”.
- 2020 INVITED MINI-COURSE, HIGHER CATEGORIES AND CATEGORIFICATION, Mathematical Sciences Research Institute, Berkeley (CA) USA, “Synthetic  $\infty$ -category theory”.

2019	INVITED MINI-COURSE, FOUNDATIONAL METHODS IN COMPUTER SCIENCE, University of Calgary, Calgary Canada, “ <i>Synthetic <math>\infty</math>-category theory</i> ”.
2019	INVITED SPEAKER, TERCER COLOQUIO DE CATEGORÍAS, ÁLGEBRA Y TEMAS AFINES, UNAM Oaxaca Mexico, “ <i>Synthetic <math>\infty</math>-category theory and <math>\infty</math>-cosmology</i> ”
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 <math>\infty</math>-category theory</i> ”
2017	INVITED SPEAKER, CATEGORIES FOR HOMOTOPY THEORY AND REWRITING, CIRM, Luminy, France, talk entitled “ <i>A complicial 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 <math>\infty</math>-categories</i> ”
2014	PLENARY SPEAKER, INTERNATIONAL CATEGORY THEORY CONFERENCE (CT14), Cambridge, UK, talk entitled “ <i>The formal theory of <math>(\infty, 1)</math>-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 complicial 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 complicial stratifications</i> ”
2008	INVITED SPEAKER, AUSTRALIAN NATIONAL UNIVERSITY, Algebra Seminar, Canberra, Australia, talk entitled “ <i>Quasi-categories, weak complicial sets and manifolds</i> ”
2008	PLENARY SPEAKER, INTERNATIONAL CATEGORY THEORY CONFERENCE (CT08), Calais, France, talk entitled “ <i>Cobordisms and Weak Complicial Sets</i> ”
2007	PLENARY SPEAKER, INTERNATIONAL CATEGORY THEORY CONFERENCE (CT07), Carvoeiro, Portugal, talk entitled “ <i>Weak complicial 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

2022	MEMBER, AUSTMS ANNUAL CONFERENCE SCIENTIFIC COMMITTEE, Australian Mathematical Society and UNSW
2021	MEMBER, AUSTMS MEDAL COMMITTEE, Australian Mathematical Society
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.

<b>2013-2016</b>	CHAIR OF ACADEMIC SENATE, responsible for leading the academic governing body of Macquarie University, <a href="http://senate.mq.edu.au">http://senate.mq.edu.au</a> , elected 2012 & 2015
<b>2013-2016</b>	MEMBER, UNIVERSITY COUNCIL, the overall governing body of Macquarie University, elected 2012 & 2015
<b>2013-2016</b>	MEMBER, UNIVERSITY COUNCIL MANAGEMENT, APPOINTMENTS & AWARDS, REMUNERATION, AND DISCIPLINE COMMITTEES
<b>2011-2016</b> <b>2013</b>	ELECTED MEMBER, ACADEMIC SENATE, elected 2010, 2012 & 2014 (with R. Garner & S. Lack) ORGANISER, INTERNATIONAL CATEGORY THEORY CONFERENCE (CT13), Macquarie University, Sydney, Australia
<b>2011-2014</b>	CHAIR, SENATE LEARNING AND TEACHING COMMITTEE, responsible for leading academic policy development for and oversight of Macquarie University's learning & teaching activities
<b>2011-2015</b>	MEMBER, MACQUARIE UNIVERSITY TEACHING EXCELLENCE ACADEMY, provide advice to the DVC Provost on all aspects of learning & teaching practice
<b>2011</b>	ACTING HEAD, DEPARTMENT OF COMPUTING, Macquarie University, Sydney, Australia
<b>2006-2008</b>	ELECTED MEMBER, ACADEMIC SENATE, elected 2005
<b>2002-2007</b>	DIRECTOR, POSTGRADUATE AND PROFESSIONAL DEVELOPMENT PROGRAMS, Division of Information and Communications Sciences, Macquarie University, Sydney
<b>2002-2007 and</b> <b>2011</b>	MEMBER, FACULTY EXECUTIVE, Division of Information and Communications Sciences, Macquarie University, Sydney
<b>2003-2007</b>	MEMBER, SENATE ACADEMIC PROGRAM COMMITTEE (APC) review, approval and quality assurance of all of Macquarie University's coursework programs
<b>2005-2007</b>	CHAIR, UNDERGRADUATE AND POSTGRADUATE SUB-COMMITTEES OF APC

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