

# 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](mailto: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 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
- 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, “Synthetic  $\infty$ -category theory”.

|      |   |
|------|---|
| 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. |
| 2013-2016 | 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><br><b>2013</b>     | ELECTED MEMBER, ACADEMIC SENATE, elected 2010, 2012 & 2014<br>(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><br><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  |

Last updated: February 15, 2023 • Typeset in [Lual<sup>A</sup>T<sub>E</sub>X](https://dom-verity.github.io)  
<https://dom-verity.github.io>