

# 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>



MACQUARIE  
University



Australian  
National  
University

## Current appointments

*Emeritus Professor, School of Mathematical and Physical Sciences, Macquarie University*  
*Honorary Professor, Mathematical Sciences Institute, Australian National University*

## Synopsis

Dominic Verity started his computational career in the early 1980s as a software developer for the influential British personal computing pioneer [Acorn Computers](#); the company that invented the now ubiquitous ARM microprocessor. He studied at the University of Cambridge (UK) and emerged from that institution in 1992 with a PhD in Pure Mathematics. From 1993-2000 he worked in the investment banking industry, as a mathematical consultant in derivative securities valuation and hedging, as a quantitative analyst in equity derivatives for Deutsche Bank Australia and as the Head of Equity Derivatives Trading for HSBC Securities Australia.

He returned to academe at the turn of the new millennium, and since then has worked as a mathematician, computer scientist, and senior academic administrator at Macquarie University. He is an internationally recognised pioneer in the field of  $\infty$ -Category Theory and is co-author of a [PROSE Award winning](#) graduate text on that topic.

His leadership career at Macquarie University includes 6 years as a member of the executive of the Division of Information and Communication Sciences (a precursor to the Faculty of Science and Engineering), carrying responsibility for business development and operational administration of its postgraduate programs. He served for 10 years as an elected member of the university's Academic Senate. In that time he acted as a member of its Academic Program Committee, carrying specific responsibility for standards and quality oversight of postgraduate programs throughout the university, and as the Chair of the university's Learning and Teaching Committee (SLTC). Ultimately he assumed overall leadership of the academic governance of the university, spending 4 years as Chair of Academic Senate. In that latter rôle he also held ex officio membership of Macquarie's governing body, the University Council.

He is a passionate and engaging teacher and in 2008 his contributions in this area were recognised by the award of a Macquarie University Vice-Chancellor's Award for Teaching Excellence. In 2011 he also gained national recognition as an educator with the award of an Australian Learning and Teaching Council Citation for Outstanding Contribution to Student Learning "*For a decade of inspirational and innovative educational leadership in the field of information technology*".

## Areas of research interest

Higher Category Theory • Homotopy Theory • Programming Languages

## APPOINTMENTS HELD

2021-	<i>Emeritus Professor of Mathematics and Computing</i> , Faculty of Science and Engineering, Macquarie University, Australia
2022-	<i>Honorary Professor of Mathematics and Casual Lecturer</i> , Mathematical Sciences Institute, College of Science, Australian National University
2023-2028	<i>External Member, Academic Board</i> , Australian National Institute of Management and Commerce, Sydney, Australia
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
2011	<i>Acting Head, Department of Computing</i> , Division of ICS, 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

## 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>
2022-	<i>Honorary Professor</i> , Mathematical Sciences Institute, Australian National University, Canberra, Australia
2021-	<i>Professor Emeritus</i> , Macquarie University, Sydney, Australia, unanimously elected by University Council, 19 <sup>th</sup> August 2021
2020, 2022	<i>Research Professor and Program Organiser</i> , Mathematical Sciences Research Institute (MSRI) program <i>"Higher Categories and Categorification"</i> , 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, <a href="#">Talbot Workshop</a> , Course title: <i>"Model-independent theory of <math>\infty</math>-Categories"</i> , Portland (OR) USA
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, "For leadership and development of postgraduate and professional development programs in Information Technology"
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

2023-2026	US Army Research Office, BAA Fundamental Science <b>80600-NC-INT</b> , "Towards a synthetic theory of (extended) TQFTs", AU\$500,458 (awarded, yet to commence)
2019-2022	(with R. Street, S. Lack & R. Garner) Australian Research Council, Discovery Project <b>DP190102432</b> , "Working synthetically in higher categorical structures", AU\$453,000
2016-2018	(with R. Street, S. Lack & R. Garner) Australian Research Council, Discovery Project <b>DP160101519</b> , "Monoidal categories and beyond: new contexts and new applications", AU\$580,900
2015-2018	(with M. Hillier, A. Fluck et. al.) Australian Government Office of Learning and Teaching, "Transforming exams across Australia: processes and platform for e-exams in high stakes, supervised environments", AU\$500,000
2013-2015	(with R. Street, S. Lack & R. Garner) Australian Research Council, Discovery Project <b>DP130101969</b> , "Structural homotopy theory: a category-theoretic study", AU\$600,000
2010-2012	(with R. Street, M. Johnson & S. Lack) Australian Research Council, Discovery Project <b>DP1094883</b> , "Applicable Categorical Structures". AU\$290,000
2007-2009	(with R. Street, M. Johnson & S. Lack) Australian Research Council, Discovery Project <b>DP0771252</b> , "Cohomology enhanced: an application of enriched and higher categories". AU\$276,000

## PHD STUDENTS

2021 ongoing	(with R. Garner) Yao Tang, "Higher categories and dependently typed logics"
2020 ongoing	(with S. Lack) Nicola Di Vittorio, "Higher derivators as a foundation for $\infty$ -category theory"
2018 ongoing	(with R. Garner) Paula Verdugo, "Synthetic $\infty$ -category theory"
2022 awarded	(with M. Johnson) Bryce Clarke, "The double category of lenses"
2020 awarded	(with R. Street) Yuki Maehara, "The Gray tensor product for 2-quasi-categories", Vice-Chancellor's Medal for Excellence
2018 awarded	(with R. Garner) Edoardo Lanari, "Cylinder objects for Grothendieck-Maltsiniotis $\infty$ -groupoids"
2015 awarded	(with R. Garner) Mitchell Buckley, "Three studies in higher category theory: fibrations, skew monoidal structures and excision of extremals"
2015 awarded	(with R. Garner) Matthew Burke, "Synthetic Lie Theory"
2012 awarded	(with R. Street) Thomas Booker, "Generalized and particular monoidal categories, and structures therein"
2012 awarded	(with R. Street) David Oury, "Duality for Joyal's category $\Theta$ and homotopy concepts for $\Theta$ -sets"
2011 awarded	(with M. Johnson) Micah McCurdy, "Cyclic $*$ -autonomous categories and the Tannaka adjunction via graphical methods"
2011 awarded	(with A. Sloane) Matthew Roberts, "Compiled generics for functional programming languages"
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

- 2023 (with M. Rovelli and V. Ozornova) GRAY TENSOR PRODUCTS AND SATURATED N-COMPLICIAL SETS, <https://arxiv.org/abs/2007.01235>, *Higher Structures* to appear.
- 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*.
- 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, *“Synthetic  $\infty$ -category theory and  $\infty$ -cosmology”*
- 2018 INVITED SPEAKER, DIAGRAMMATIC REASONING IN HIGHER EDUCATION, University of Newcastle, *“An exploration of String Diagrams in Computer Science”*
- 2018 INVITED MINI-COURSE, TOPOLOGY IN AUSTRALIA AND SOUTH KOREA (AMSI), POSTECH, Pohang, South Korea, *“An introduction to model independent  $\infty$ -category theory”*
- 2017 INVITED SPEAKER, CATEGORIES FOR HOMOTOPY THEORY AND REWRITING, CIRM, Luminy, France, talk entitled *“A complicit compendium”*
- 2016 INVITED SPEAKER, INTERNATIONAL CATEGORY THEORY MEETING (ICTM2016) Dalhousie University, Halifax, Canada, talk entitled *“On the Yoga of (Un)straightening”*
- 2016 INVITED SPEAKER, 31ST SUMMER TOPOLOGY CONFERENCE, University of Leicester, UK, talk entitled *“A monadic account of Lurie’s (un)straightening construction”*
- 2015 INVITED SPEAKER, JOHNS HOPKINS TOPOLOGY SEMINAR, Baltimore MD, USA, talk entitled *“The Unbearable Lightness of 2-Being”*
- 2015 PLENARY SPEAKER, INTERNATIONAL CATEGORY THEORY CONFERENCE (CT15), Aveiro, Portugal, talk entitled *“The calculus of modules for  $\infty$ -categories”*
- 2014 PLENARY SPEAKER, INTERNATIONAL CATEGORY THEORY CONFERENCE (CT14), Cambridge, UK, talk entitled *“The formal theory of  $(\infty, 1)$ -categories”*
- 2013 INVITED SPEAKER, HARVARD TOPOLOGY SEMINAR, Cambridge MA, USA, talk entitled *“Cobordisms and weak complicit sets”*
- 2012 INVITED SPEAKER, MIT TOPOLOGY SEMINAR, Cambridge MA, USA, talk entitled *“Homotopy coherent adjunctions and the walking adjunction”*
- 2010 PLENARY SPEAKER, INTERNATIONAL CATEGORY THEORY CONFERENCE (CT10), Genova, Italy, talk entitled *“On the 2-category theory of quasi-categories”*
- 2009 PLENARY SPEAKER, INTERNATIONAL CATEGORY THEORY CONFERENCE (CT09), Cape Town, South Africa, talk entitled *“Weak complicit sets and iterated Segal spaces”*
- 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 *“On the non-canonicity of complicit stratifications”*
- 2008 INVITED SPEAKER, AUSTRALIAN NATIONAL UNIVERSITY, Algebra Seminar, Canberra, Australia, talk entitled *“Quasi-categories, weak complicit sets and manifolds”*
- 2008 PLENARY SPEAKER, INTERNATIONAL CATEGORY THEORY CONFERENCE (CT08), Calais, France, talk entitled *“Cobordisms and Weak Complicit Sets”*
- 2007 PLENARY SPEAKER, INTERNATIONAL CATEGORY THEORY CONFERENCE (CT07), Carvoeiro, Portugal, talk entitled *“Weak complicit sets and internal quasi-categories”*
- 2006 KEYNOTE SPEAKER, 50TH ANNIVERSARY MEETING OF THE AUSTRALIAN MATHEMATICAL SOCIETY, Sydney, Australia, talk entitled *“Non-abelian cohomology as the raison d’être for higher category theory”*
- 2005 INVITED SPEAKER, STREETFEST, CONFERENCE AND WORKSHOP IN HONOUR OF ROSS STREET’S 60TH BIRTHDAY, Sydney and Canberra, Australia, talk entitled *“A simplicial weak category theory”*



## 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
2017-2022	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 & 2014
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
2013-2016	CHAIR, UNIVERSITY LEVEL C PROMOTION COMMITTEE AND MEMBER, UNIVERSITY LEVELS D AND E PROMOTION COMMITTEES
2015	MEMBER, APPOINTMENTS COMMITTEES FOR DVC ACADEMIC, DEAN OF ARTS AND DEAN OF HUMAN SCIENCES
2015	EXTERNAL MEMBER, UNIVERSITY OF SYDNEY PROFESSORIAL PROMOTION COMMITTEE
2011-2016	ELECTED MEMBER, ACADEMIC SENATE, elected 2010, 2012 & 2014
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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<https://dom-verity.github.io>