Colin S. McLarty

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Education

Ph.D. Philosophy, Case Western Reserve University, 1980.
Dissertation: Things and Things in Themselves: The Logic of Reference in Leibniz, Lambert, and Kant.
Advisors: Raymond J. Nelson and Chin-Tai Kim.

M.A. Philosophy, Case Western Reserve University, 1975.

B.S. Mathematics, Case Institute of Technology, 1972.

Area of Specialization: Logic; history and philosophy of mathematics.

Areas of Competence: Philosophy of Science; History of Philosophy esp. Plato, Kant; Contemporary French Philosophy.

Employment

University of Notre Dame,Visiting Associate Professor, Philosophy, Fall 2002.

Harvard University, Visiting Scholar, Mathematics 1995–1996.

Case Western Reserve University, Philosophy 1987–. Chair of Department 1996–2010.

Cleveland State University, Lecturer, Mathematics 1984–1986.

Cleveland Art Institute, Lecturer, Philosophy 1984–1986.

Current Research

My Summer School at Roskilde, Denmark on formal axioms for a structural foundation for mathematics, expanded my Beijing (2007) talk and is now a book forthcoming with OUP. I pursue the perspective one mathematician expressed to me saying "philosophers should know our objects only have the properties we say they do." Those are purely structural properties and in practice they rest on *category theory*. Philosophers debate the mathematics and the ontology. My recent articles show how this ontology suits current research and textbooks. And I have a series of articles on Emmy Noether (1882–1935, generally considered the greatest of woman mathematicians) and Saunders Mac Lane (1909–2005, greatly influenced by Noether) showing how deep the attitude goes in 20th century mathematics.

I write on Alexander Grothendieck's vast reconception of geometry and number theory. His life is also dramatic, e.g. he was among 5,000 children sheltered from the Nazis in Le Chambon France. I am preparing a biography. For comparison I have published on Greek mathematics and Plato.

On-going technical work on logic is reflected in my *Philosophia Scientiae* and *Theory and Applications of Categories* and forthcoming *Bulletin of Symbolic Logic* articles.

Selected Grants

Co-organizer (with Ralf Krömer and Michael Wright) of a one week Mini-Workshop Category Theory and Related Fields: History and Prospects, Mathematisches Forschungsinstitut Oberwolfach, February 2009.

Director of a six week NEH Summer Seminar: "Proofs and refutations in mathematics today", at CWRU June 25–August 3, 2001.

NSF Science, Society and Technology Studies Scholars Award, $79,993 for "Alexander Grothendieck and the history of homology theory", 1995–98.

NEH Summer Stipend for "The idea of 'shape' in early topology", 1994.

NEH Summer Seminar Michael Resnik's "Frege and the Philosophy of Mathematics", UNC Chapel Hill, June 8–July 31, 1992.

NEH Summer Institute George Lucas's "Philosophic Uses of Historical Tradition", Clemson University, June 13–July 26, 1990.

Languages

Conversational French.

Speaking and reading German.

Reading and touristic speaking in Dutch and Italian.

Reading ancient Greek.

Beginning Mandarin.

Publications

Book

Elementary Categories, Elementary Toposes, 1992, Clarendon Press Oxford. Paperback 1995. Third printing 1999.

Articles

Forthcoming:

"What does it take to prove Fermat's Last Theorem?" in page proofs, for the *Bulletin of Symbolic Logic*."

"The central insight of categorical mathematics," invited, final draft submitted, for C. Glymour, W. Wang, D. Westerstahl eds. *Invited talks of the Thirteenth International Congress of Logic, Methodology and Philosophy of Science, Beijing, 2007.* Studies in Logic and Foundations of Mathematics, King's College Pub'ns, London.

"Theology and its discontents: David Hilbert's foundation myth for modern mathematics," invited, final draft sent in, for a book grown out of the meeting "Mathematics and Narrative," Delphi, Greece, July 2007.

"David Corfield interviewed by Colin McLarty," invited, in draft for a book grown out of the meeting "Mathematics and Narrative," Delphi, Greece, July 2007.

In Print:

“Emmy Noether” biographical article for T. Gowers ed. *The Princeton Companion to Mathematics*. Princeton University Press 2008. Pages 800–01.

Two articles: “What structuralism achieves,” and “ ‘There is no ontology here’: visual and structural geometry in today’s arithmetic,” invited for Paolo Mancosu ed. *The Philosophy of Mathematical Practice*, Oxford University Press, 2008. Pages 354–406.

Biographies of Claude Chevalley, Jean Dieudonné, André Weil (the founders of the group Bourbaki) total 11,000 words. *New Dictionary of Scientific Biography* 2007.

Biography of Garrett Birkhoff, *New Dictionary of Scientific Biography* 2007.

Biography of Saunders Mac Lane, co-authored with William Lawvere, *New Dictionary of Scientific Biography* 2007.

“The Rising Sea: Grothendieck on simplicity and generality I” in Jeremy Gray and Karen Parshall eds. *Episodes in the History of Recent Algebra*, American Mathematical Society, 2007, pp. 301–26.

“The last mathematician from Hilbert’s Göttingen: Saunders Mac Lane as a philosopher of mathematics”, *British Journal for the Philosophy of Science* **58** (2007), 77-112.

“Two aspects of constructivism in category theory” invited by *Philosophia Scientiae*, Cahier Spécial 6, 2006, 95–114.

“Emmy Noether’s ‘Set Theoretic’ Topology: From Dedekind to the rise of functors”, Jeremy Gray and José Ferreirós ed.s *The Architecture of Modern Mathematics: Essays in history and philosophy*, Oxford, 2006, 211–35.

“Saunders Mac Lane and the universal in mathematics” *Scientiae Mathematicae Japonicae*, **19** (2006) 25–28.

“Every Grothendieck topos has a one-way site”, *Theory and Applications of Categories*, **16**, (2006) 123–26.

“Emmy Noether and the Independent Social Democratic Party of Germany”, *Science in Context* **18** (2005) 429–50.

“Saunders Mac Lane (1909–2005) His Mathematical Life and Philosophical Works”, *Philosophia Mathematica* **13** (2005) 237–251.

“ ‘Mathematical platonism’ versus gathering the dead: What Socrates teaches Glaucon”, *Philosophia Mathematica* **13** (2005) 115–34.

Philosophical commentary to: William Lawvere “An Elementary Theory Of The Category Of Sets (Long Version),” in *Reprints in Theory and Applications of Categories* **12** (2005) 1–35.

“Learning from Questions on Categorical Foundations”, *Philosophia Mathematica* **13** (2005) 44–60.

“Exploring Categorical Structuralism", *Philosophia Mathematica* **12** (2005) 37–53.

“Richard Courant in the German Revolution", *Mathematical Intelligencer* **23** no.3 (2001) 61-67.

“Semantics for first and higher order realizability", in Anderson and Zeleny eds. *Logic, Meaning, and Computation*, Kluwer Academic 2001, 353–64.

"Mac Lane, Saunders", biographical article for *Encyclopaedia Britannica*, January 2000.

"Voir Dire in the case of mathematical progress", in E. Grosholz and H. Breger eds, *The Growth of Mathematical Knowledge*. Kluwer, 2000. 269-80.

"Category theory: Introduction to" and "Category theory: Applications to the foundations of mathematics". *Routledge Encyclopedia of Philosophy* (1998).

"Poincaré: Mathematics & Logic & Intuition", *Philosophia Mathematica* **5** (1997) 97–115.

"Category theory in real time", *Philosophia Mathematica* **2** (1994) 36–44.

"Numbers can be just what they have to", *Noûs* **27** (1993), 487–98. Translated to Hungarian as "Miért ne lehetnének a számok azok, amiknek lenniük kell?" in Csaba Ferenc ed. *A matematika filozófiája a 21. század küszöbén* (Philosophy of Mathematics at the Start of the 21st Century), Budapest: Osiris, 2003.

"Anti-foundation and self-reference", *Journal of Philosophical Logic* **22** (1993) 19–28.

"Failure of cartesian closedness in NF", *Journal of Symbolic Logic* **57** (1992) 555–56. Reprinted in Follesdal ed. *The Philosophy of Quine*, Garland, 2000, vol.5, 109–11.

"Axiomatizing a category of categories", *Journal of Symbolic Logic* **56** (1991) 1243–60.

"The uses and abuses of the history of topos theory", *British Journal for the Philosophy of Science*, **41** (1990) 351–75.

"Stable surjection logic", *Diagrammes*, **22** (1989) 45–57.

"Defining sets as sets of points of spaces", *Journal of Philosophical Logic*, **17** (1988) 75–90.

"Elementary axioms for canonical points of toposes", *Journal of Symbolic Logic*, **52** (1987) 202–04.

"Left exact logic", Journal of Pure and Applied Algebra, **41** (1986) 63–66.

"Local, and some global, results in synthetic differential geometry", in A. Kock ed. *Category Theoretic Methods in Geometry*, (Aarhus Denmark: Aarhus Universitet, 1983), 226–56.

Book Reviews

S. Duffy, *Virtual Mathematics: The Logic of Difference*, Bolton England: Clinamen Press 2006, the *Australasian Journal of Philosophy* (June, 2008) 332–36.

C. Chihara, *A Structural Account of Mathematics*, Oxford, 2004, in *Notre Dame Philosophical Reviews*, August 2004, (2,500 words).

J. Mayberry *The Foundations of Mathematics in the Theory of Sets* Cambridge 2000, in *Philosophy of Science* **69** (2002), 404–06.

A. Herreman, *La topologie et ses signes*. L'Harmattan 2000, in *Isis* **93** (2002), 328.

P. Ehrlich, *Real Numbers, Generalizations of the Reals, and Theories of Continua*, Kluwer 1994, in *Philosophy of Science* **66** (1999) 500–01.

S. Lavine *Understanding the Infinite*, Harvard 1994, in *Notre Dame Journal for Formal Logic*, **38** (1998) 314-24.

J-P. Belna, *La notion de nombre chez Dedekind, Cantor, Frege*, Vrin 1996, in *Isis* **89** (1998), 145–46.

J. Chapman and F. Rowbottom, *Relative Category Theory and Geometric Morphisms*, Oxford 1992, in *Modern Logic* **4** (1994) 345–47.

J.L. Bell, *Toposes and Local Set Theory*, Oxford 1988, in *Notre Dame Journal of Formal Logic*, **31** (1990) 150–61.

S. Mac Lane, *Mathematics: Form and Function*, Springer-Verlag 1986, in *Journal of Philosophy*, **84** (1987) 33–37.

Reviews In Mathematical Reviews

R. Krömer, *Tool and Object. A History and Philosophy of Category Theory*. Birkhäuser Verlag, 2007. 2008d:01013.

G. Hellman, "Mathematical pluralism: the case of smooth infinitesimal analysis", 2007k:03193.

H. Nishimura, "Synthetic differential geometry of higher-order differentials", 2008a:18011a.

S. Awodey, *Category Theory*. Oxford 2006. 2007i:18001.

M. Grandis, "Equilogical spaces, homology and noncommutative geometry", 2006e:18005.

S. Awodey, and J. Eliasson, "Ultrasheaves and double negation", 2005m:03138.

F. Lawvere, "Foundations and applications: axiomatization and education (Paris, 2000)", 2004j:03011.

P. Johnstone, *Sketches of an Elephant: A Topos Theory Compendium*. Oxford 2002. 2003k:18005.

G. Mazzola, *The Topos of Music. Geometric Logic of Concepts, Theory, and Performance*. With CD-ROM. Birkhäuser Verlag 2002. 2004a:00013.

C. Oriat, *Étude des specifications modulaires: constructions de colimites finies, diagrammes, isomorphismes.* I and II. 01g:68066 and 01g:60867.

I. Moerdijk and J. Vermeulen, "Proof of a conjecture of A. Pitts", 01c:1800.

A. Kock and G. Reyes, “A note on frame distributions", 2000i:18006.

I. Moerdijk, “Classifying spaces for toposes with enough points", 99m:18002.

S. Awodey, “Structure in mathematics and logic", 99c:03106.

C. Jay, “Finite objects in a locos", 98a:18003.

M. Gerner and R. Guitart, “The locally free relatively filtered diagram as an inductive completion of a system of choice", 98a:03102.

J. Tavakoli, “Locally free vector spaces in a topos", 96m18010.

A. Carboni, “Some free constructions in realizability and proof theory", 96j03088.

M. Bunge and A. Carboni, “The symmetric topos", 96i18004.

H. Simmons, “The glueing construction and lax limits", 96d10002.

F. Lawvere, “Cohesive toposes and Cantor’s lauter Einsen", 95e00020.

I. de Freitas Druck, “Un modèle de filtres pour l’analyse réelle synthétique", 94g18001.

J. Chapman and F. Rowbottom, *Relative category theory and geometric morphisms. A logical approach.* Oxford 1992. 93i:18004.

L. Stout, “The logic of unbalanced subobjects", 93c03071.

W. Tulczyjew, “Partial categories of differentiable relations", 93b10000.

Robinson et al., “Colimit completions and the effective topos", 91f03130.

S. Mac Lane, “Concepts and categories in perspective", 90k01019a and b.

H. Sato, “E-CCC: Between CCC and topos", 90e68068.

C. Szasz, “(n,m)-objekt in einem Elementartopos", 89i10002.

M. Makkai, “Stone duality for first order logic", 89h03067.

G. Meloni and E. Rogora, “Global and infinitesimal observables", 89m58003.

Selected Talks

“Single-sorting, and first order axioms for the category of categories as foundation,” invited for special session, European conference of the Association for Symbolic Logic, Sofia Bulgaria, August 2009.

“Identity and existence in categorical foundations,” Conference on Philosophy and Foundations of Mathematics, Swedish Collegium for Advanced Study, Uppsala, May 2009; also invited for special session Association for Symbolic Logic summer meeting, South Bend, May 2009.

“Hilbert and the origin myth of modern mathematics,” American Mathematical Society National Meeting, Washington DC, January 2009.

“Arithmetic for Philosophers: current methods in number theory,” Midwest Philosophy of Mathematics Work shop, University of Notre Dame, November 2008.

“The central insight of categorical mathematics,” invited talk at the Thirteenth International Congress of Logic, Methodology and Philosophy of Science, Beijing, 2007. Expanded to 15 hour Summer School at Roskilde University, Denmark, July–August 2008.

“Emmy Noether’s ‘Set Theoretic Foundations’ for topology: from Dedekind to the rise of functors", Universidad de Sevilla, Spain, September 17–19, 2003, Université de Paris 7, October 2005.

“Mathematics, philosophy, and foundations in the work of F.W. Lawvere”, École Normale Supérieur, Paris, October 2005. Streaming video at
www.diffusion.ens.fr/index.php?res=conf&idconf=933

“Mathematics as Philosophy: Mac Lane, Grothendieck, Lawvere", Ramifications of Category Theory Symposium, Florence Italy, November 18–22, 2003.

“The Rising Tide: Alexander Grothendieck on simplicity and generality", at the Mathematical Sciences Research Institute, Berkeley CA conference: The History of Algebra in the 19th and 20th Centuries April 21–25, 2003. Streaming video at www.msri.org/communications/video/index06.html

“Geometry and Logic", Conference on the History and Philosophy of Modern Mathematics, Open University, Milton Keynes, UK, May 2002.

“Emmy Noether and the notion of structuralist mathematics", Centre de Recherches Mathématiques, Montréal, Canada, November 2001.

“Georg Cantor’s Kardinalzahlen as categorical set theory", joint meeting of the American Philosophical Association and the Association for Symbolic Logic Minneapolis, May 2001.

“Category theory along the Seaway", Centre de Recherches Mathématiques, Montréal, Canada, August 2000.

“Element-centered axioms for the category of sets", Saunders Mac Lane’s category theory seminar, Chicago, November 1999.

“Resnik’s ‘science of patterns’ as a generalized mereology", Wholes and Parts conference, Istituto Mitteleuropeo di Cultura, Bolzano Italy, June 1998.

“Early adventures in the life of ‘logicism, formalism, and intuitionism’ ", Department of Philosophy, Harvard, December 1996.

“ ‘Poor taste as a bright trait of character’: Emmy Noether’s politics and mathematics", Department of the History of Science, Harvard, December 1996.

“Geometry and Logic", Deutsche Gesellschaft für mathematischen Logik und Grundlagenforschung annual meeting, Jena Germany, September 1996.

“On Michael Resnik’s theory of patterns", Canadian Society for History and Philosophy of Mathematics, St. Catherine’s Ontario, June 1996.

“Comparative set theory", UCLA Logic Colloquium, February 1995.

“Voir Dire in the case of mathematical progress", Conference on the Growth of Mathematical Knowledge, Pennsylvania State University, April 1995.

“Towards a history of Alexander Grothendieck’s algebraic geometry", University of Chicago Algebraic Geometry Seminar, December 1994.

“The peripeties of intuitionistic logic", American Mathematical Society Mathfest, Session on History of Mathematical Logic, Minneapolis, August 1994.

“Modern and Post-Modern in the history of mathematics: What’s France got to do with it?", Department of History of Science, Harvard, December 1993.

“Category theoretic foundations", Department of Philosophy, University of Florence, Italy, November 1991.

“Why category theory is not a foundation for mathematics", International Congress on Logic, Methodology and Philosophy of Science, Uppsala Sweden, August 1991.

“Anti-foundation and self-reference", Association for Symbolic Logic meeting, Pittsburgh, January 1991.

“Axiomatizing a category of categories", Bangor, Wales, July 1989. University of Florence November 1991.

“Real time conceptual change in mathematics", Sigma Club, Cambridge England, June 1989.

“Stable surjection logic", at the conference Journées d’Étude en Logique, Université de Paris 7, 1988.

“J.H. Lambert: Scientific rationalism in Kant’s immediate pre-critical background", Tri-State Philosophical Association meeting, Edinboro PA, 1978.

Service

On the Editorial Boards of *Philosophia Mathematica* and of *The Notre Dame Journal for Formal Logic*, Editorial Advisory Board of the series “Advanced Studies in Mathematics and Logic" for Polimetrica Publishers.

Book MS refereed for: Birkhäuser Verlag, Oxford University Press, Cambridge University Press, SUNY Press. University of Chicago. Articles refereed for: *Philosophia Mathematica, Journal of Symbolic Logic, Notre Dame Journal of Formal Logic, Synthese, Australasian Journal of Philosophy*.

Taught in pilot project for the Seminar Approach to General Education and Scholarship, undergraduate curriculum reform for CWRU. Three years of a freshman seminar on mathematics from Thales and Pythagoras to Hypatia, teaching geometry, philosophy, and critique of historical evidence.

Ph.D. examiner for: Université Nice Sophia Antipolis (France), University of Chicago, University of Western Ontario, University of Adelaide (Australia), CWRU.

Grant applications reviewed for: Guggenheim Foundation, National Endowment for Humanities USA, Natural Science and Engineering Research Council of Canada, Social Science and Humanities Research Council of Canada, Fonds pour la Formation de Chercheurs et l'Aide à la Recherche Québec. Idaho Board of Education.

Professional Memberships And Honors

Association for Symbolic Logic, Philosophy of Science Association, American Philosophical Association.

Associate of the Center for Philosophy of Science, University of Pittsburgh.

Listed in *American Men and Women of Science*, since 1995. Listed in *Who's Who in the World* since 2000. Listed in *Who's Who in America* since 2002.