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**EDUCATION**

1975-81: Ph.D. (Philosophy)	University of Western Ontario
1973-75: MA (Philosophy)	McGill University
1972-73: PGCE (Education)	University of Oxford
1969-72: BA (Physics)	University of Oxford

**AOS:** Early Modern Philosophy; Philosophy of Time and Space; History and Philosophy of the Infinite; Philosophy of Physics; History of the Exact Sciences; History of Materialism.

**AOC:** Logic; Philosophy of Mathematics; Philosophy of Biology; Philosophy of the Enlightenment; Philosophy of Language.

**ACADEMIC EMPLOYMENT**

2002-... Professor, Philosophy, McMaster University, Hamilton, Ontario.  
2001-02 Visiting Research Associate, Institute for the History and Philosophy of Science and Technology (IHPST), University of Toronto, Canada (on sabbatical leave from Middlebury).  
1998-2010 Associated Scholar, IHPST, University of Toronto, Canada  
1998 Professore a Contratto, Dipartimento di Filosofia, Università di Bologna, Italy; (Spring Term; on Family Leave from Middlebury).  
1996-02 Professor, Philosophy, Middlebury College, Vermont.  
1994-95 Visiting Research Associate, IHPST, University of Toronto, Canada (on sabbatical leave from Middlebury).  
1993 Visiting Professor, Philosophy, York University, Toronto, Canada; (Spring Term; on Family Leave from Middlebury).  
1991-96 Associate Professor, Philosophy, Middlebury College, Vermont. Tenure granted May 1991.  
1985-91 Assistant Professor, Philosophy, Middlebury College, Vermont.  
1982-85 Lecturer, Applied Mathematics, University of Western Ontario (UWO), London, Canada.  
1981-82 Lecturer 1 (= Assistant Professor), Dept. of Religious Studies and Philosophy, University of Calabar, Nigeria.  
1980-81 Teaching Assistant, Dept. of Applied Mathematics, UWO.  
1978-80 President, Society of Graduate Students, UWO (full time).  
1978-79 Research Assistant, Department of Philosophy, UWO.  
1975-78 Instructor, Dept. of Philosophy, UWO.  
1973-75 Teaching Assistant (for Charles Taylor), Dept. of Philosophy, McGill University, Montreal.  
1973 Secondary School Teacher (1 term), Malvern College, England.  
1969 Secondary School Teacher (2 terms, for Save the Children Fund), Starehe Boys' Centre, Nairobi, Kenya.

## DISSERTATIONS

Ph.D.: *Time and Temporal Becoming in the Foundations of Physics*, UWO, 1981; Thesis Advisor: William Demopoulos.

MA: *A Disquisition on Properties*, McGill Univ., 1976; Thesis Advisor: Mario Bunge.

## PUBLICATIONS

## BOOKS

*Natural Deduction: An introduction to logic with real arguments, a little history and some humour*. Broadview Press. May, 2011.

*Leibniz: The Labyrinth of the Continuum. Writings of 1672 to 1686*: a selection, edition and translation of unpublished Latin manuscripts by Leibniz on the problem of the composition of the continuum, with an introductory essay; Yale Leibniz Series, edited by Robert Sleigh and Daniel Garber; Yale University Press, 2001.

## FORTHCOMING

*The 'Now' in Physics*. Accepted for publication by Springer-Verlag (expected publication date 2011); co-authored with Steven Savitt (UBC) and Dennis Dieks (Utrecht). (200 ms. pp.; my contribution one third)

*Leibniz*. A book on Leibniz for Polity's Classic Thinkers Series, aimed at undergraduates and a lay readership, accepted for publication by Polity Press, UK (expected publication date 2012; 80,000 words).

## ARTICLES &amp; BOOK CHAPTERS

## FORTHCOMING

"The Labyrinth of the Continuum", for the *Oxford Handbook of Leibniz*, ed. Maria Rosa Antognazza (Oxford University Press, 2012) [7,000 words]

"Atoms", for the *Cambridge Descartes Lexicon*, ed. Larry Nolan (Cambridge University Press, 2011) [900 words]

"Presupposition, Aggregation, and Leibniz's Argument for a Plurality of Substances", accepted for *Leibniz Review*, 2012 [7,596 words].

"Beeckman's Discrete Moments and Descartes's Disdain", for a volume of *Intellectual History Review on Seventeenth Century Space and Time*, ed. Ed Slowik and Geoffrey Gorham. [-24 pp. 7,500 words]

"Can thought experiments be resolved by experiment? The case of 'Aristotle's Wheel'", for *Philosophical Thought Experiments*, ed. Letitia Meynell, Jim Brown and Melanie Frappier, a volume in the Routledge Philosophy of Science series, exp. publ. date 2012 [5,000 to 7,000 words].

"Time Atomism and Ash'arite Origins for Cartesian Occasionalism, Revisited" forthcoming in *Asia, Europe and the Emergence of Modern Science: Knowledge*

*Crossing Boundaries*, ed. Arun Bala, Palgrave MacMillan, 2012. [25 pp. 8,847 words]

“Leibniz’s Theory of Space”, *Foundations of Science*, for a special edition on 17th C space-time, ed. Karin Verelst and Maarten Van Dyck. (40 pp., 15,881 words.)

“‘ $x + dx = x'$ : Leibniz’s Archimedean infinitesimals”, a chapter in *Structure and Identity*, ed. Karin Verelst, Royal Academy, Brussels. (23 pp., 7,740 words.)

“‘A complete denial of the continuous?’ Leibniz’s philosophy of the continuum,” accepted but probably never forthcoming in a special edition of *Synthese* devoted to the Mathematics and Philosophy of the Continuum, 2010? [36 pages, double-spaced]

“Leibniz’s Inversion of Zeno: Continuity of Motion, Substantial Action and Plurality”, accepted but probably never forthcoming in *Studia Leibnitiana*, ed. Massimo Mugnai and Enrico Pasini, 2010? [41 pages, double-spaced]

#### INVITED

“Proper Time”, an entry for the *Oxford Handbook of Spacetime*, ed. Vesselin Petkov

#### SUBMITTED

“Virtual Processes and Quantum Tunnelling as Fictions”, submitted for a special issue of *Science & Education* devoted to the appraisal of Mario Bunge’s contribution to philosophy, ed. David Blitz.

“Leibniz’s Actual Infinite in Relation to his Analysis of Matter”, for a volume on *The Interrelations between Philosophy and Mathematics in Leibniz*, ed. Norma Goethe, Philip Beeley and David Rabouin. [-22 pp. 10,000 words]

#### REVISE AND RESUBMIT

“Leibniz’s Syncategorematic Infinitesimals, Smooth Infinitesimal Analysis, and Newton’s Proposition 6”, submitted to *Archive for the History of Exact Sciences*, July 2010 [43 pages, double-spaced]

“On Newton’s fluxional proof of the vector addition of motive forces”, submitted to *Historia Mathematica*, September 2010 [28 pages, 1<sup>1</sup>/<sub>2</sub>-spaced]

#### PUBLISHED

“Zeno’s Paradoxes”, in *The Classical Tradition*, ed. Anthony Grafton, Glenn W. Most, and Salvatore Settis, Harvard University Press, 2010, pp. 1012-1013(?).

“Minkowski’s Proper Time and the Status of the Clock Hypothesis”, in *Space, Time and Spacetime*, ed. Vesselin Petkov, Berlin, Heidelberg, Springer-Verlag, 2010, pp. 159-180.

“Materialist Theories of Time”, in *Chrono-topologies: Hybrid Spatialities and Multiple Temporalities*, ed. and Introduced by Leslie Kavanaugh, Rodopi Press, Amsterdam/New York, 2010, pp. 43-62.

“Actual Infinitesimals in Leibniz’s Early Thought”, in *The Philosophy of the Young*

*Leibniz, Studia Leibnitiana Sonderhefte 35*, ed. Mark Kulstad, Mogens Laerke and David Snyder, 2009, pp. 11-28.

"Time Lapse and the Degeneracy of Time: Gödel, Proper Time and Becoming in Relativity Theory," in *The Ontology of Spacetime II*, ed. Dennis Dieks, Elsevier, 2008, pp. 207-227.

"Leery Bedfellows: Newton and Leibniz on the Status of Infinitesimals," pp. 7-30 in *Infinitesimal Differences: Controversies between Leibniz and his Contemporaries*, ed. Ursula Goldenbaum and Douglas Jesseph, De Gruyter, 2008.

"Beeckman, Descartes and the Force of Motion", *Journal for the History of Philosophy*, 45, no. 1, 1-28; January, 2007.

"Leibniz's Body Realism: Two Interpretations", with Peter Loptson, *Leibniz Review*, 16, pp. 1-44, December 2006.

"Minkowski Spacetime and the Dimensions of the Present", pp. 129-155 in *The Ontology of Spacetime*, ed. Dennis Dieks, Elsevier, 2006.

"Animal Generation and Substance in Sennert and Leibniz", pp. 304-359 in *The Problem of Animal Generation in Modern Philosophy*, ed. Justin Smith. Cambridge: Cambridge University Press, 2005.

"Lo zenonismo come fonte delle monadi di Leibniz: una risposta a Paolo Rossi", *Rivista di storia della filosofia*, 2, 155-160, 2003.

"The Enigma of Leibniz's Atomism", *Oxford Studies in Early Modern Philosophy*, Volume 1, 183-227, 2003.

"On thought experiments as *a priori* science," *International Studies in the Philosophy of Science*, 13, 3, 215-229, 1999.

"Cohesion, Division and Harmony: Physical Aspects of Leibniz's Continuum Problem (1671-1686)," *Perspectives on Science*, 6, nos. 1 & 2, 110-135, 1998.

"Infinite Aggregates and Phenomenal Wholes," *Leibniz Review*, 8, 25-45, December 1998.

"Newton's Fluxions and Equally Flowing Time," *Studies in History and Philosophy of Science*, 28, no. 2, pp. 323-351, June 1995.

"Space and Relativity in Newton and Leibniz," *British Journal for the Philosophy of Science* 45, 1994, pp. 219-240. Reprinted as pp. 61-82 in *Leibniz*, ed. Catherine Wilson, Aldershot/Burlington: Ashgate 2001.

"Bloomin' Confusion: Democracy and Deceit in the Great Books Debate," *The World and I*, vol. 5, no. 11, pp. 578-594, November 1990.

"Foil for Newton: Howard Stein on Locke, Huygens and Newton," pp. 49-56 in *Philosophical Perspectives on Newtonian Science*, ed. R. I. G. Hughes and Phillip Bricker, Cambridge: Bradford Books, MIT Press, 1990.

“Russell’s Conundrum: On the Relation of Leibniz’s Monads to the Continuum,” pp. 171-201 in *An Intimate Relation: Studies in the History and Philosophy of Science*, ed. James Robert Brown and Jürgen Mittelstraß, Dordrecht: Kluwer Academic Publishers, 1989.

“Continuous Creation, Continuous Time: A Refutation of the Alleged Discontinuity of Cartesian Time,” *Journal for the History of Philosophy*, vol. XXVI, no. 3, July 1988; pp. 349-375.

“Leibniz’s Theory of Time,” pp. 263-313 in *The Natural Philosophy of Leibniz*, ed. Kathleen Okruhlik and James R. Brown, D. Reidel: Dordrecht, 1985.

“Exacting a Philosophy of Becoming from Modern Physics,” *Pacific Philosophical Quarterly* 63, 2, pp. 101-110, April 1982.

“The Empiricist Account of Scientific Knowledge: A Polemical Evaluation,” *Poznan Studies* 3, 2, pp. 125-141, 1977.

“On Reference as a Component of Meaning in Science,” *Philosophica* 18, 2, pp. 59-75, 1976.

#### CONFERENCE PROCEEDINGS

“Leibniz’s Archimedean Infinitesimals,” *Proceedings of the Canadian Society for History and Phil. of Mathematics*, 21, 1-10, 2008.

“Leibniz and Cantor on the Actual Infinite,” pp. 41-46 in *Nihil sine ratione*, Vol. 1, ed. Hans Poser, Berlin: Gottfried-Willhelm-Leibniz-Gesellschaft, 2001.

“The transcendentalism of  $\pi$  and Leibniz’s philosophy of mathematics,” *Proceedings of the Canadian Society for History and Phil. of Mathematics*, 12, 13-19, 1999.

“Relations of Time and Space,” pp. 9-16 in *Leibniz und Europa*, ed. Herbert Breger, Hanover: Gottfried-Willhelm-Leibniz-Gesellschaft, 1994.

“On the Unappreciated Novelty of Leibniz’s Spatial Relationalism,” pp. 26-33 in *Leibniz: Tradition und Aktualität*, ed. Albert Heinekamp, Hanover: Gottfried-Willhelm-Leibniz-Gesellschaft, 1988.

“Space as an Order of Situations”, *Abstracts, LMPs '87*, Vol. 2, Moscow: Institute of the Academy of Sciences of the USSR, 21-23, August 1987.

“Leibniz on Continuity,” pp. 107-115 in *PSA 1986*, Vol. 1, ed. Arthur Fine and Peter Machamer, East Lansing, 1986.

#### REVIEW ARTICLES AND DISCUSSIONS

“The remarkable fecundity of Leibniz’s work on infinite series,” *Annals of Science*, 63(2), 221-225, April 2006.

“Leibniz on Infinite Number, Infinite Wholes and the Whole World: A Reply to Gregory Brown”, *Leibniz Review*, 11, 103-116, December 2001.

“Infinite Number and the World Soul; in defence of Carlin and Leibniz,” *Leibniz Review*, **9**, 105-116, December 1999.

“Deep in Leibniz’s Labyrinth” (review article of Philip Beeley’s *Kontinuität und Mechanismus*), *Leibniz Society Review*, **7**, 25-42, December 1997.

#### BOOK REVIEWS

*Isaac Newton on Mathematical Certainty and Method*, Niccolò Guicciardini (MIT Press, 2009), in *British Journal for the History of Science*, **44**, 01, March 2011, 122 - 124.

*Leibniz: Body, Substance, Monad*, Daniel Garber (Oxford UP, 2009), in *British Journal for the History of Philosophy*, **18**, 4, 2010, 721-724.

*Newton as Philosopher*, Andrew Janiak (Cambridge UP, 2007), in *Notre Dame Philosophical Reviews* (Jan 23, 2009), <http://ndpr.nd.edu/review.cfm?id=15088>.

*Leibniz and the Natural World*, Pauline Phemister, *Philosophical Quarterly*, **57**, 226, January 2007, 133-137.

*Leibniz: Metaphilosophy and Metaphysics: 1666-1686*, Andreas Blank, in *Notre Dame Philosophical Reviews* (May 6, 2006), <http://ndpr.nd.edu/review.cfm?id=6503>.

*On Leibniz*, Nicholas Rescher, in *Philosophy in Review* **24**, 1 (February 2004), 51-53.

*What was Mechanical about Mechanics: The Concept of Force between Metaphysics and Mechanics from Newton to Lagrange*, J. Christiaan Boudri (2002), in *Annals of Science* **61** (2004), 240-241.

*Substance and Individuation in Leibniz*, Jan Cover and John O’Leary-Hawthorne (1999), in *The Philosophical Quarterly* **51**, 205, pp. 540-542 (October 2001).

*Leibniz and Clarke: A Study of their Correspondence*, Ezio Vailati (1997), in *Mind* **110**, 439 (July 2001), 874-878.

*Squaring the Circle: The War between Hobbes and Wallis*, Douglas Jesseph (1999), in *International Studies in the Philosophy of Science* **15**, 1 (March 2001), 112-115.

*Reading the Principia: The Debate on Newton’s Mathematical Methods for Natural Philosophy from 1687 to 1736*, Niccolò Guicciardini (1999), in *Historia Mathematica* **28** (2001), 54-57.

*Reasoning with the Infinite: From the Closed World to the Mathematical Universe*, Michel Blay (1998), in *Annals of Science* **57**, 102-103, 2000.

*Mathematischer, Naturwissenschaftlicher und Technischer Briefwechsel/ G.W. Leibniz*, vol. 4 (1683-1690), H-J Hess, James O’Hara and Herbert Breger (1995), in *Isis* (International Journal for the History of Science), 1997.

*De Summa Rerum: metaphysical papers 1675-1676/ G.W. Leibniz*, G. H. R. Parkinson (1992), in *Leibniz Society Review*, **2**, December 1993.

*Temporal Relations and Temporal Becoming: A Defense of a Russellian Theory of Time*, L. Nathan Oaklander (1984), in *Philosophy of Science*, 54, 1, 142-143, March 1987.

*The Investigation of the Physical World*, G. Toraldo di Francia (1981), in *Philosophy of Science*, 50, 3, 516-518, September, 1983.

*Quantum Mechanics, a Half Century Later*, J. Leites Lopes and M. Paty (eds.) (1977), in *Philosophy of Science*, 48, 1, 156-161, March 1981.

#### CONFERENCE PAPERS PRESENTED

“Presupposition, Aggregation, and Leibniz’s Argument for a Plurality of Substances”, at the *Fifth Annual Leibniz Society of North America Conference*, UCSD San Diego, June 15-17, 2011.

“On the mathematization of motion before instantaneous velocity: Galileo and Descartes”, for a workshop I co-organized “On the Contested Expanding Rôle of Applied Mathematics from the Renaissance to the Enlightenment”, Pisa, 13th-16th September, 2010.

“Can thought experiments be resolved by experiment? The case of ‘Aristotle’s Wheel’”, for a workshop “Science without Data? The Role of Thought Experiments in Empirical Investigations”, organized by Melanie Frappier and Letitia Meynell in Halifax, Nova Scotia, June 2010.

“Leibniz’s Actual Infinite and the Analysis of Matter,” *Mathesis metaphysica quadam: Leibniz, between Mathematics and Philosophy*, a workshop on the Interaction between Leibniz’s mathematics and his metaphysics, Université de Paris, March 2010.

“Beeckman’s Discrete Moments and Descartes’ Disdain”, American Philosophical Association, Central Division Annual Meeting, Chicago, February 2010.

“Time Atomism and Ash‘arite Origins for Cartesian Occasionalism, Revisited”, Conference on Asia-Europe Dialogue and the Making of Modern Science, Singapore, May 8, 2009.

“Minkowski’s Proper Time and the Clock Hypothesis”, Third International Conference on the Ontology of Spacetime, Concordia University Montreal, June 14, 2008.

“Time and Inertia”, at the third Time and Universe Cluster Workshop, Concordia University, Montreal, June 11, 2008.

“Leibniz’s Archimedean infinitesimals”, joint session of the CSHPS and CSHPM, June 3, 2008.

“ $x + dx = x'$ : Leibniz’s Archimedean infinitesimals”, Workshop on Structure and Identity, Royal Academy, Brussels, Belgium, December 8-10th, 2007.

“Time, Inertia and the Relativity Principle”, Symposium on Time and Relativity, Institute for Advanced Study, University of Minnesota, October 25-27th, 2007.

“On the Flow of Time”, International Conference on the Metaphysics of Time, University of Bergamo, Italy, September 6-8th, 2007.

“Five Objections to Becoming Dissipated”, second Time and Universe Cluster Workshop, Concordia University, Vancouver, May 2007.

“The Degeneracy of Time”, Second International Conference on the Ontology of Spacetime, Concordia University Montreal, June 2006; and at the first Time and Universe Cluster Workshop, Concordia University, Montreal, June 2006.

"Leery Bedfellows: Newton and Leibniz on the Status of Infinitesimals", Loemker Conference: The Metaphysical and Mathematical Status of Infinitesimals in Leibniz's Time, Emory University, March 31, 2006.

““A complete denial of the continuous?” Leibniz’s law of continuity,” invited paper for a session on "Leibniz: Mathematics and Nature", APA Western Division Meeting, San Francisco, CA March 23-27, 2005.

““A complete denial of the continuous?” Leibniz’s philosophy of the continuum,” invited paper for a mini-conference on *The Continuum in Mathematics and Philosophy*, The Carlsberg Academy, Copenhagen, November 25-27<sup>th</sup>, 2004.

“Animal Generation and Substance in Sennert and Leibniz”, *Midwest Seminar and Central Canada Seminar for the Study of Early Modern Philosophy*, London, Ontario, September 2004.

“On the Premodern Theory of Motion: Galileo and Descartes”, *Canadian Society for the History and Philosophy of Science*, Winnipeg, Manitoba, June 2004.

“Minkowski Spacetime and the Dimensions of the Present”, International Conference on the Ontology of Spacetime, Montreal, May 2004.

“On the Premodern Theory of Motion: Galileo and Descartes”, *International Conference on the Philosophy of Science*, Dubrovnik, Croatia, April 2004.

“Actual infinitesimals in Leibniz's early theories of the continuum,” *International Conference on the Young Leibniz*, Houston, April 2003.

“Beeckman, Descartes and the force of motion,” *Central Canada Seminar for the Study of Early Modern Philosophy*, Toronto, April 2002.

“Leibniz and Cantor on the Actual Infinite,” *VII Internationaler Leibniz-Kongreß*, Berlin, September 2001.

“How Leibniz Went Beyond the At-At Theory of Motion,” *Canadian Society for the History and Philosophy of Science*, Québec, May 2001.

“On Leibniz’s Solutions to Zeno’s Dichotomy,” *Corporeal Substances and the Labyrinth of the Continuum in Leibniz: An International Workshop*, Florence Center for the History and Philosophy of Science, Italy, November 23-25, 2000.



“The transcendentalism of  $\pi$  and Leibniz’s philosophy of mathematics,” *Canadian Society for the History and Philosophy of Mathematics*, Toronto, Canada, July 1999.

“On Thought Experiments and A Priori Physics: A Brown Study,” 25th Annual Meeting of the *Philosophy of Science Conference*, Inter-University Centre, Dubrovnik, Croatia, April 1999.

“Three Chronic Errors: Some misconceptions concerning the Direction of Time”, 24th Annual Meeting of the *Philosophy of Science Conference*, Inter-University Centre, Dubrovnik, Croatia, April 1998.

“Infinite Aggregates and Phenomenal Wholes,” invited address to the Annual Meeting of the Leibniz Society of North America, APA, Philadelphia, December 1997.

“The Enigma of Leibniz’s Atomism,” *Midwest Seminar in the History of Early Modern Philosophy*, Fall Meeting, Chicago, December 1996.

“Physical Aspects of Leibniz’s Continuum Problem,” Dibner Institute Symposium on *Leibniz and the Sciences*, MIT, December 1995.

“Relations of Time and Space,” VI. *Internationaler Leibniz-Kongreß*, Hanover, Germany, July 1994.

“On Newton’s Parallelogram Law and the Calculus,” *Canadian Society for the History and Philosophy of Science*, Ottawa, June 1993.

“Three Chronic Errors in the Usual Accounts of Time’s Arrow,” *Canadian Philosophical Association/Canadian Society for the History and Philosophy of Science*, Ottawa, June 1993.

“Newton on Relative Space,” *History of Science Society*, Madison, November 1991.

“On the Unappreciated Novelty of Leibniz’s Spatial Relationalism,” V. *Internationaler Leibniz-Kongreß*, Hannover, November 1988.

“Newton and the Moon: Newton’s Proof and Application of his Precession Theorem,” with William Harper, *History of Science Society*, Raleigh, November 1987.

“The Metaphysical Basis of Newton’s Method of Fluxions,” *History of Science Society*, Raleigh, November 1987.

“Space as an Order of Situations,” *8th International Congress of Logic, Methodology and Philosophy of Science*, Moscow, August 1987.

“Leibniz on Continuity,” *Philosophy of Science Association*, Biennial Meeting, Pittsburgh, October 1986.

“Combinatorial Topology and Leibniz’s Theory of Space,” *Society for Exact Philosophy*, Annual Meeting, Hawaii, February 1986.

“Aspects of Newton’s Argument for Universal Gravitation,” with William Harper, *Canadian Society for the History and Philosophy of Science*, Annual Conference, Montreal, June 1985.

“Continuous Creation and the Continuity of Time in Descartes’ Philosophy,” *Canadian Society for the History and Philosophy of Science*, Annual Conference, Montreal, May 1985.

“The Theory of Fluxions and Newton’s Philosophy of Time,” *Canadian Society for the History and Philosophy of Science*, Annual Conference, Halifax, June 1981.

“A New Slant on the Direction of Time,” *Canadian Philosophical Association*, Annual Congress, Halifax, May 1981.

“Exacting a Philosophy of Becoming from Modern Physics,” *Society for Exact Philosophy*, Annual Meeting, Halifax, May 1981.

“A Note on Transiency in Relativistic Physics,” *Canadian Philosophical Association*, Annual Congress, Montreal, June 1980.

#### COMMENTS ON CONFERENCE PAPERS

Comments on Shelley Weinberg, “Possible World Construction and the Paradox of Compossibility”, *Canadian Philosophical Association Annual Congress*, London, Ontario, May 28-31, 2005.

Comments on Txetxu Ausín, “Leibniz and Toulmin: on Rationalism without Dogmas”. *OSSA: The Uses of Argument*, Hamilton, Ontario May 18-21, 2005.

Comments on Karl Ameriks’ “Kantian Romanticism and the Project of Enlightenment” and Graham Garrard’s “The Enlightenment Project: What it is,” Session IV, #25, *North-East American Society for Eighteenth-Century Studies*, Durham, New Hampshire, December, 1999.

“Comments on Herman Erlichson’s ‘Passage to the Limit in Proposition 1, Book 1, of Newton’s *Principia*’,” *Infinitesimals: Concepts and Applications: A One-day Conference*, University of Western Ontario, London, Canada, October 30, 1999.

“Peirce’s Statistical Mechanical Theory of Teleology: Comments on Andrew Reynolds,” *Canadian Philosophical Association*, Annual Congress, St. John’s, Nfld., June 1997.

“Was Kant’s Philosophy of Mathematics Right for its Time? Comments on Paul Rusnock,” *Canadian Philosophical Association*, Annual Congress, St. Catharines, Ont., June 1996.

“French Polish: Comments on Steven French’s ‘Hacking Away at the Identity of Indiscernibles’,” *American Philosophy Association*, Eastern Division, Annual Meeting, Washington, D.C., December 1992.

“On Mind-Body Interaction in Descartes: Comments on Murray Miles,” *Canadian Philosophical Association*, Annual Congress, Québec, May 1989.

“Foils for Newton: Howard Stein on Locke, Huygens and Newton,” *Philosophical Perspectives on Newtonian Science, Yale University Newton Tricentennial Conference*, November 1987.

“Time Loops and Big Bangs: Comments on Pucetti’s ‘The Silence of the Future’,” *Canadian Society for the History and Philosophy of Science*, Annual Congress, Guelph, June 1984.

“Comments on Foss’s ‘Bohr Re-interpreted-Complementarity in Classical Mechanics’”, *Canadian Philosophical Association*, Annual Congress, Montreal, June 1980.

#### DEPARTMENTAL LECTURES AND PANELS

"De indivisibilibus: Leibniz's Archimedean Infinitesimals", Scuola Normale Superiore and the Centro De Giorgi, Pisa, Italy, April 11, 2008.

"De infinito: Leibniz's Theory of the Actual Infinite", Scuola Normale Superiore and the Centro De Giorgi, Pisa, Italy, April 8, 2008.

"De tempore: Leibniz's Theory of Time", Scuola Normale Superiore and the Centro De Giorgi, Pisa, Italy, April 7, 2008.

"De compositione: Leibniz on Aggregation", Scuola Normale Superiore and the Centro De Giorgi, Pisa, Italy, April 4, 2008.

"Leibniz and the Elimination of Time", Department of Philosophy, University of British Columbia, BC, February 1, 2008.

"Materialist Theories of Time", Faculty of Architecture, University of Delft, Netherlands, December 12, 2007.

"Materialist Theories of Time", Proemial Lecture for the Tri-University PhD Program, Wilfrid Laurier University, Waterloo, Ontario, September 28, 2007.

"MacCafé: Does God Really Exist?" (with David Hitchcock), McMaster University Alumni Association, Burlington, Ontario, June 26, 2007.

"The Origins of Newton's Laws", The Origins Institute, McMaster University, March 20, 2006.

"Was Leibniz an Immaterialist?" (with Peter Loftson, University of Guelph), Department of Philosophy, McMaster University, January 27, 2006.

"A Potted History of Reflection on Time", an address for the Sicilian Cultural Society of Canada in Aurora on the occasion of the unveiling of the statue "Clepsydra Man", televised in Toronto on Channel 35, August 29<sup>th</sup>, 2004.

"Leibniz's Actual Infinite as an Alternative to Cantor's Transfinite," Logic Colloquium, McMaster University, April 2003.

“Leibniz contro Cantor sull’infinito attuale,” Dipartimenti di Matematica e Filosofia, Università di Firenze, Florence, April 2002; Dipartimento di Filosofia, Università di Bologna, Bologna, April 2002.

“On Leibniz’s Inversion of Zeno’s Dichotomy,” Department of Philosophy, University of Toronto, November 2001; Department of Philosophy, York University, February 2002; McMaster University, February 2002.

“Leibniz versus Cantor on the Actual Infinite,” Department of Mathematics, York University, January 2002.

“Force and the Calculus in Newton’s Early Work,” IHPST (Institute for the History and Philosophy of Science and Technology), University of Toronto, October 2001.

“What is Life?,” Faculty Panel Discussion, Clifford Symposium, Middlebury College, October, 1999.

“Schrödinger’s Cat and Wheeler’s Eye,” Wonnacott Commons, Middlebury College, November 1998; The Philosopher’s Forum, Middlebury College, March 1997.

“Time in Seventeenth Century Natural Philosophy,” Dipartimento di Filosofia, Università di Padova, Padua, May 1998.

“From Atoms to Monads: Leibniz’s Theory of Substance as a Solution to the Continuum Problem”, Dept. of Philosophy, University of Guelph, March 1998; Dipartimento di Filosofia, Università di Firenze, Florence, April 1998.

“The Enigma of Leibniz’s Atomism,” IHPST, University of Toronto, February 1995; Middlebury College, Middlebury, March 1996; Dept. of Philosophy, McGill University, March 1997; Dipartimento di Filosofia, Università di Bologna, Bologna, March 1998.

“Reflections on Bloom’s *The Closing of the American Mind* ten years after Publication,” Political Forum, Middlebury College, February 1997.

“Mind and Space in Seventeenth Century Philosophy,” IHPST, University of Toronto, April 1995.

“Cosmic Hubris: Are We the Reason for the Universe? A Discussion of the Anthropic Principle,” Middlebury College, Middlebury, May 1994.

“Relations and Leibniz’s Nominalism,” Department of Philosophy, York University, Toronto, March 1993.

“Leibniz on Space and Relativity,” Department of Philosophy, University of Ottawa, November 1991; IHPST, University of Toronto, February 1992; Department of Philosophy, Concordia University, Montreal, March 1992.

“Newton’s Fluxions and Equably Flowing Time,” IHPST, University of Toronto, January 1990; Department of Philosophy, York University, Toronto, February 1992.

“Time Atoms: Buddhism, Basra and Descartes’s Dream,” Middlebury College, April 1991.

“Relative Space in Newton and Leibniz,” Department of Philosophy, York University, Toronto, February 1990.

“Russell’s Conundrum: On the Relation of Leibniz’s Monads to the Continuum,” McMaster University, Hamilton, February 1990.

“Quantum Theory and Materialism,” Department of Philosophy, Middlebury College, May 1989.

“Continuous Creation and the Continuity of Time in Descartes’ Philosophy,” Department of Philosophy, University of Manitoba, April 1986; Department of History of Medicine and Science, University of Western Ontario, April 1986.

“Continuity in Seventeenth Century Mathematics,” Department of Applied Mathematics, University of Western Ontario, April 1985.

“Leibniz’s Theory of Time,” *Peter of Padua Society*, Department of Philosophy, University of Western Ontario, April 1983.

“On Humanism” (with Dr. Howard Woodhouse), “Inspiration” (a television series on religion), channel 9, *Nigerian Television*, Calabar, October 1981.

“Transiency, time reversal and tachyons,” *Symposium*, Department of Philosophy, University of Western Ontario, January 1980.

“The Quantum Theory of Radiation of Bohr, Kramers and Slater: An Historical Study,” *Symposium*, Department of Philosophy, University of Western Ontario, November 1978.

“Towards a New Theory of Sense and Reference,” *Symposium*, Department of Philosophy, University of Western Ontario, May 1978.

“The Objectivity of Knowledge,” *Symposium*, Department of Philosophy, University of Western Ontario, February 1977.

## COURSES TAUGHT

[Key: F = Fall, J = Jan., W = Winter (Jan-April), S = Spring (Feb-May), U = Summer  
URC = Undergraduate Reading Course, GRC = Graduate Reading Course]

### McMaster University

Origins of Space-time (Origins Institute)	2011W, 2008F
Philosophy of the Enlightenment	2011W, 2008F
Leibniz and the Labyrinth (Grad. Seminar)	2011W, 2009W
Introductory Logic	2011F, 2010F, 2009F, 2008F, 2006F, 2005F, 2004F
Philosophy of Modern Science (Arts&Sci)	2010F
Philosophy of Language	2011F, 2010W
The Flow of Time (Grad. Seminar)	2010W

Historical Context of Modern Science (Arts&Sci)	2009F
Spinoza's Philosophical Psychology (GRC)	2009U
Social Construction and Continental Thought (GRC)	2007U
Philosophy of Science	2009W, 2007W
The Infinite (GRC)	2004F
Natural Philosophy of Descartes and Leibniz	2006W, 2004W
Issues in the Philosophy of Time (Grad. Seminar)	2007W, 2005W, 2002F
Time and Consciousness (GRC)	2003W
The Infinite (URC)	2003W
Problems of Philosophy	2003W, 2003F

### Middlebury College

Issues in the Philosophy of Time	2001S, 1997S, 94S, 91S, 86S
Introduction to the History of Modern Science	2001S, 1999S, 96S, 92F, 90F, 87F
Enlightenment Philosophy	2000F, 1999S, 95F, 92F
Introduction to Modern Logic	2000F, 1999F, 98F, 97F, 96F, 96S, 93F, 92S, 90F, 89S, 87F, 86F, 86S
Science and Society	2000S, 1996F
What is Life?	2000S
Philosophy of Physics	1999J
Early Modern Philosophy	1999F, 97F, 91F
Physics and the Mind of God	1998F, 97S
The Infinite	2001J, 1996J, 94J
Cosmos and Revolution	1995F, 91S
Intermediate Logic	1994S, 88S
Theories of the Universe	1993F, 91F
Introduction to the Philosophy of Science	1992S
Quantum Reality	1992J, 87J
A Hitchhiker's Guide to Philosophy	1991J, 88J,F
History of Materialism	1989S, 86F
Philosophy of Science	1988F, 87S, 85F
Hobbes and Leibniz	1988S
Introduction to Philosophy	1987S, 85F
Theories of Motion from Kepler to Newton	1986J

### University of Bologna, Italy

Time in 17th C Natural Philosophy	1998S
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### York University, Toronto, Canada

Exploring Philosophy	1993W
Leibniz (Graduate Seminar)	1993W

### University of Western Ontario, London, Canada

Introduction to Calculus	1984-85, 83-84
Numerical Analysis	1984-85
Introductory Math. for Social Scientists	1985U, 1984U
Philosophy of Education	1977-78
Reasoning and Critical Thinking	1975-76, 76-77

### University of Calabar, Nigeria

Introduction to Logic	1981-2
Philosophy of Science	1981-2
Epistemology and Metaphysics	1981-2
History of Philosophy-Bacon to Kant	1981-2

#### GRADUATE SUPERVISIONS

External Examiner for: Vincenzo De Risi, Scuola Normale, Pisa, Italy (2005)  
 Emmaline Bexley, University of Melbourne (2008)  
 Tamar Levanon, University of Haifa (2009)

Supervisor:

PhD: Haixia Zhong (2009-), Bryce Ferrie (2003-05, withdrawn), Paul Sweeney, (2003-07, withdrawn), Jordan Burks (2006-07); Monika Mandoki (2006-07)

MA: Jeremy Livingston (completed 2005), Adam Harmer (completed 2006), Patrick Riesterer (completed 2006), Jim Monier-Williams (completed 2007), Jolen Galaugher (completed 2008).

Supervisory Committee:

PhD: Mireille Truong (completed 2002), Gülberk Koç (2004-10), Jill Gilbert (2004-07), Jeremy Livingston (2005-), Qilin Li (2006-), Jeremy Proulx (2007-10); Jolen Galaugher (2008-), Scott Balasak (2009), Adam Sopuck (2010).

MA: Kent MacAskill (completed 2002), David Payne (completed 2004), Joe L'Esperance (completed 2005), Michael Volek (completed 2006), Benjamin Doxtdator (completed 2006), Jessica Murphy (completed 2006), Jolen Galaugher (2005-07).

#### RESEARCH FUNDING

SSHRC Cluster Design Grant, January-December 2005: \$17,000. Time and Universe: addressing philosophical problems concerning time in the context of the creation of a feasible theory of quantum gravity.

SSHRC Cluster Grant, Interim Funding, January - December 2006, \$25,000. Time and Universe.

ORS, McMaster University, January - December 2006, \$5,000. Matching grant for Time and Universe project.

#### WORK IN PROGRESS

*Ariadnean Threads: Leibniz on time, space, motion, atoms, substance, the infinite, infinitesimals and the composition of the continuum*: a book offering a new interpretation of Leibniz's philosophy based on his solution to the continuum problem. Under consideration by Oxford University Press.

*The 'Now' in Physics*: co-authored with Steven Savitt (UBC) and Dennis Dieks (Utrecht): a defence of temporal becoming in the sense of local passage, as opposed to the traditional version of becoming as a global phenomenon, where the *now* is construed as a kind of hyperplane on which future is converted to past. I am the main

author for chapters on the history of the ‘now’ in philosophy, and on time in quantum theory. Under consideration by Springer Verlag.

*Matters of Moment: Time, Force and Activity in Early Modern Natural Philosophy*: a treatment of the interconnection of views on time, force and activity in seventeenth century natural philosophy. I trace the origins of Newton's views on time to Barrow, Gassendi and van Helmont, and show the connection between Newton's views on time and force and his development of the theory of fluxions, what we call "the calculus", and the connection between the equability of time and Huygens' equation of time, so important for determining longitude. I also show how Newton develops his concept of force from its origins in his studies of Descartes. Descartes, in turn, is shown to have taken most of the key ideas of his physics of motion –including the law of inertia and conservation of (what we call) momentum, usually ascribed to Newton– from his friend and mentor, the underrated Isaac Beeckman, working in the tradition of a revived atomism. This leads to a tension at the heart of Cartesian metaphysics between atomistic and continuist conceptions of time and force, which is resolved independently and in very different ways by Newton and his main rival, the German polymath Leibniz.

Other draft papers written include “Time, Inertia and the Relativity Principle”, “On the Flow of Time”, “Leibniz in Cantor’s Paradise: a Dialogue on the Actual Infinite,” and “Force, Fluxions and Inertia: Implications of Newton’s First Proof of the Parallelogram Law.”

#### LEARNED SOCIETY MEMBERSHIPS

Canadian Society for the History and Philosophy of Science (2<sup>nd</sup> VP 2002-05, 1<sup>st</sup> VP 2005-07, President: 2007-10), Canadian Philosophy Association, Leibniz Society of America (Exec 2001-05), Canadian Society for the History and Philosophy of Mathematics, Society for Exact Philosophy, International Society for the Advanced Study of Spacetime.

#### PROFESSIONAL SERVICE

Occasional referee for the journals *Archiv für Geschichte der Philosophie* (2010), *Foundations of Science* (2010), *Leibniz Review* (2007, 2008, 2009), *Humana Mente* (2008), *Philosophy and Phenomenological Research* (2006), *Early Science and Medicine* (2006), *Journal for the History of Philosophy* (2002-03, 2006), *Historia Mathematica* (2002, 2003, 2006), *Journal of Philosophical Logic* (2005), *Dialectica* (2005) *Studies in the History and Philosophy of Modern Physics* (2004), *British Journal for the Philosophy of Science* (2004), *International Journal for the Philosophy of Science* (2002-03), *Dialogue* (2002), *Nous* (2002), *Mind* (2001), *Philosophy of Science* (1998), *Canadian Journal of Philosophy* (1997), *Philosophical Studies* (1996); for Westview Press (2001), McGill-Queens Press (2002), Routledge (2002), Yale University Press (2005), Elsevier (2007); for the National Endowment for the Humanities (1995); and the Social Science and Humanities Research Council (Canada) (1996, 2006); Killam Fellowship (2003); European Science Foundation (2005).

Organizer and joint selector of papers for two sessions of the Mid-West Seminar in Chicago in the History of Early Modern Philosophy, Spring and Fall 1997; and for the CCSSEMP in Guelph in the Fall of 2005.



## COLLEGE AND UNIVERSITY SERVICE

- 2008-11 Curriculum Committee, Philosophy Dept., McMaster.  
 2008-11 Director, Guelph-Laurier-McMaster Joint Doctoral Programme.  
 2008-11 Tenure and Promotion Committee, Philosophy Dept., McMaster.  
 2009-10 Graduate Studies, External Scholarship Ranking Committee.  
 2008-09 PhD Advisor, Philosophy Dept., McMaster University.  
 2002-07 Chair, Department of Philosophy, McMaster University.  
 2006-07 Tenure and Promotion Committee, Philosophy Dept., McMaster.  
 2006-07 Appointments Committee, Philosophy Dept., McMaster.  
 2006 External Assessor, Review of the Department of Philosophy, Memorial University, Newfoundland.
- 2005-06 Academic Planning Committee, McMaster.  
 2002-07 Dean's Advisory Council, Humanities, McMaster.  
 2002-07 Tri-University Steering Committee  
 2002-07 PhD Admissions Committee, Philosophy Dept., McMaster.  
 2002-07 MA Admissions Committee, Philosophy Dept., McMaster.  
 2002-07 CPM Ranking Committee, Philosophy Dept., McMaster.  
 2003-04 Elected Member of the Senate, McMaster University.  
 2003-04 Senate Executive, McMaster University.  
 2003-04 Senate By-Laws Committee, McMaster University.  
 2003-04 Dean of Graduate Studies Ad Hoc Committee, McMaster University.  
 2002-05 Appointments, Promotion and Tenure Committee, Philos., McMaster.  
 2002-03 Dean of Humanities Selection Committee, McMaster University.  
 2000-01 Curriculum Committee, Middlebury College.  
 1995-99 Chair, Department of Philosophy, Middlebury College.  
 1997-98 Faculty Rep., Student Disciplinary Committee, MC.  
 1994-98 President, Middlebury College Local Chapter, AAUP.  
 1993-94 Human Subjects Committee, Middlebury College.  
 1991-92 Human Relations Committee, Middlebury College.  
 1991-92 Environmental Studies Program Steering Committee, Middlebury College.
- 1990-91 Honor Code Review Committee, Middlebury College.  
 1988-89 Library Committee, Middlebury College.  
 1988-89 Steering Committee, Environmental Studies Program, Middlebury College.
- 1987-88 Curriculum Committee, Middlebury College.  
 1985-87 Pre-Law Committee, Middlebury College.  
 1978-80 President, Society of Graduate Students, UWO.  
 1978-80 Executive Member, Faculty of Graduate Studies, UWO.  
 1979 Senate Committee on University Planning, UWO.  
 1978-79 Senate Promotion and Tenure Committee, UWO.  
 1978-79 Senate Committee on Academic Programmes, UWO.  
 1978-79 Chairperson, National Graduate Constituency, NUS.  
 1978 First Vice-President, Society of Graduate Students, UWO.  
 1977-79 Secretary, Ontario Graduate Association.  
 1976-78 President, 'Symposium' (Philosophy Graduate Students' Society), UWO.