Curriculum Vitae

Michèle Friend

Areas of Specialisation
Philosophy of Mathematics,
Philosophy of Logic,
Philosophy of Relativity Theory,
Philosophy of Chemistry,
Philosophy of Ecological Economics,
Philosophy of Computer Science.

Areas of Competence
Philosophy of Science,
Epistemology,
Philosophy of Language.

Areas of Publication
Philosophy of Mathematics,
Philosophy of Relativity Theory,
History of Logic,
Philosophy of Computer Science,
Aesthetics and Philosophy of Sport,
Philosophy of Systems Science,
Philosophy of Literature.

Languages:
Fluent: English,
Fluent oral: English, French
Rudimentary: German, Portuguese, Hungarian.

Citizenship:
British, Canadian.

Sex:
Female

Websites
http://uccs.univ-lille1.fr/index.php/fr/annuaire/489-friend-michele
https://philosophy.columbian.gwu.edu/michele-friend

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Cysoing
France 59830

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Scholarships, Fellowships and Awards

2020 STaRS Chair d'excellence.

2019 Enhanced Travel Award, George Washington University. $2000.00

2019 Honorarium for lecture, Philosophy of Mathematics, Special Interest Group of the Mathematical Association of America. $200.00

2018 Honorarium for lecture, Humboldt University, Berlin. Travel and hotel.

2017-8 Visiting professor IIEST, Shipur Howrah, India 28 Dec. 2017 – 14 January 2018. Travel within India and room and board in India.

2017 Visiting Professor at the Centre for Logic and Philosophy of Science (Centrum voor Logica en Wetenschapsfilosofi), VUB (Vrije Universiteit Brussel). One month accommodation 3 – 30 March.

2016 Visiting Professor at the Instituto de Investigaciones Filosóficas at UNAM (Universidad Nacional Autónoma de México) 3 September to 31 October. 77, 010.00 Mexican Pesos = US$ 4139.65.

2013 – 2015. Two-year research project: "Representation, dimensions of thought and epistemic mediators". Director of Research: Norma B. Goethe. Granting body: Secretary of Science and Technology, National University of Cordoba (Argentina). There are six researchers altogether, including me. The amount of the grant is not public information in Argentina. Therefore, I think it would be indiscrete for me to disclose it here. It is not a significant amount.

2012. George Washington University internal grant for developing a course in the philosophy department to figure in the minor for sustainability. $2000.

2010 – 2011. Two Year Research Project: "Modes of Representation, Theory and Practice". Director of research: Norma B. Goethe. Granting body: Secretary of Science and Technology, National University of Cordoba (Argentina).

April 2011 – May 2011. Guest at the Rényi Institute of Mathematics, Budapest.

Nov. 2010 – Dec. 2010. Visiting Fellowship St. Andrews University.

July 2010 – July 2011. CCSS (Columbian College Facilitating Fund) for research.

June 2003 – Sept. 2003. Dilthey Fellowship for Interdisciplinary project.

Oct. 1995 – Oct. 1996. St. Andrews University Fees Award. Pays the difference between foreign and domestic university fees.

Oct. 1994 – Oct. 1995. St. Andrews University Fees Award.

Oct. 1993 – Oct. 1994. St. Andrews University Fees Award.

Oct. 1994 – June 1995. Overseas Research Student Fellowship.

Oct. 1993 – June 1994. Overseas Research Student Fellowship.

Sept. 1995 – Sept. 1996. Social Sciences and Research Council of Canada, PhD Scholarship.

Sept. 1994 – Sept. 1995. Social Sciences and Research Council of Canada, PhD Scholarship.

Education

1997, PhD.: **Department of Logic and Metaphysics, School of Philosophy, University of St. Andrews, Scotland**
Second Order Logic is Logic
Supervisors: Dr. Peter Clark, Dr. Stephen Read and Professor Stewart Shapiro.
Internal examiner: Professor Crispin Wright.
External examiner: Professor William Demopoulos (University of Western Ontario).

1993, MA: **Philosophy Department, McGill University, Canada**
The Possibility of Frege's Logicism
Supervisor: Professor Michael Hallett.
Internal examiners: Professor David Davies and Professor Paul Pietrosky.
External examiner: Professor William Demopoulos (University of Western Ontario).

1990, BA (honours): **Philosophy Department, McGill University, Canada**
The Topology of Time
Supervisor: Professor Storrs McCall.

2015, Oxford Summer School: **Balliol College, England**
Oxford Summer School in Ecological Economics

Other Qualification

2017 Enseignant, chercheur: Section 17 (Philosophie) Universités de France

Employment

Feb. 2020 – Jan. 2023	UCCS (Unité de Catalyse et de la Chimie des Solides), Université Lille Nord-Europe, CNRS.
Sept. 2013 – Jan.2020	Associate professor, **George Washington University.**
Sept. 2007 – Sept. 2013	Assistant professor, tenure-track, **George Washington University**.
Sept. 2001 – June 2007	Assistant professor on two successive 3-year appointments at **George Washington University**.
Oct. 2000 – June 2001	Lecturer, **University of Manchester**.
Jan. 2000 – June 2000	Lecturer, **London School of Economics**.
July 1999 – Dec. 1999	Ontological engineer, **Cycorp,** Austin, Texas.
Jan. 1999 – April 1999	Lecturer, **University of Reading**.
Oct. 1998 – Dec. 1998	Tutor, **University of Hertfordshire**.
Oct. 1993 – May 1996	Tutor, **University of St. Andrews**.
Sept. 1992 – Dec. 1992	Teaching Assistant, **McGill University**.

Publications

Published and Peer Reviewed: Books, Chapters, Articles and Reviews

Books

(In progress.) *The Policy Compass: Method, use and scope*. Series: Methodos. Springer Nature.

2014 *Pluralism in Mathematics; A New Position in Philosophy of Mathematics*. Logic, Epistemology and the Unity of Science, Springer. http://www.springer.com/us/book/9789400770577.

2007 *Introducing Philosophy of Mathematics*. Acumen. Re-printed March 2010. Copyright now held by Wiley-Blackwell. Translated into Greek in 2019 and published by Επίκεντρον.

Edited Section of Handbook, Special Edition of Journal and Co-Edited Book

2019 ongoing (publication dates vary with the dates of contributions, final date of publication 2024). Section Editor for the section on Pluralist Views of Mathematics for the *Handbook of the History and Philosophy of Mathematical Practice*. Springer Nature.

2017 Co-Edited with Mihir Chakraborty. *Mathematical Pluralism*, Special Issue of the Journal of the Indian Council of Philosophical Research, Springer. JICPR Vol. 34.2

2007 *Induction, Algorithmic Learning Theory and Philosophy.* Michèle Friend, Norma Goethe and Valentina Harizanov (eds.). Logic, Epistemology and the Unity of Science 9, Dordrecht: Springer. http://www.springer.com/us/book/9781402061264.

Chapters

(Submitted for review Feb. 2021). Facing and resolving tensions in the biofuel industry. In Transitions Énergétiques: Entre solutions et paradoxes, Caroline Norrant et Murielle Rivenet (Eds.) Special issue of : *Territoire en mouvement : Revue de géographie et Aménagement.*

(Submitted for review, Nov. 2020). "Assessing the suitability of biomass conversion processes by region: economic, social and ecological context" by Michèle Friend. To appear in the second edition of *Biorefinery*; *From Biomass to Chemicals and Fuels* Michele Aresta, Angela Dibenedetto and Franck Dumeignil (Eds.). DeGuyter. First edition published in 2012. Https://doi.org/10.1515/9783110260281.

(Forthcoming March 2021) "In the Footsteps of Hilbert, The Andréka-Németi Group's Logical

Foundations of Theories in Physics". Co-written with Giambattista Formica. *Hajnal Andéka and István Németi on the Unity of Science: From Computing to Relativity Theory Through Algebraic Logic*. Judit Madarász and Gergely Székely (Eds.) Series: Outstanding Contributions to Logic, Springer.

2019 "Varieties of Pluralism and Objectivity in Mathematics" Re-printed in: *Reflections on the Foundations of Mathematics: Univalent Foundations, Set Theory and General Thoughts*. Editors: Dr. Stefania Centrone, Dr. Deborah Kant, and Dr. Deniz Sarikaya. Synthese Library, Vol. 407. Springer. Pp. 345 -362.

2018 "Keeping Globally Inconsistent Scientific Theories Locally Consistent". Co-written with María del Rosario Martínez-Ordaz. *Contradictions, From Consistency to Inconsistency.* Trends in Logic 47. Walter Carnielli and Jacek Malinowski (eds.) Springer Nature Switzerland. pp. 53 – 89.

2018 Remarks of a Philosopher of Mathematics and Science; Commentary on Louis Kauffman's "Cybernetics, Reflexivity and Second-Order Science", in (Alexander Riegler, ed.) *New Horizons for Second-Order Cybernetics*. Series on Knots and Everything, Vol. 60. Alexander Reigler, Karl H. Müller & Stuart A. Umpleby (Eds.) World Scientific, pp. 327 – 333.

(Submitted, 2017) "Environmentally Sound Practice in Chemistry" for a conference proceedings edited by Jean-Pierre Llored, following the International Society for the Philosophy of Chemistry meeting held in Paris 2017.

2017 Mathematical Theories as Models. *Humanizing Mathematics and its Philosophy; Essays Celebrating the 90th Birthday of Reuben Hersh*. Bharath Sriraman (Ed.) Birkhäuser. DOI 10.1007/978-3-319-61231-7_21

2015 A Eulogy to Classical Dressage Riding. *The Palace.* Salla Tykkä. Gallery Anhava, Helsinki.

2012 Pluralism and "Bad" Mathematical Theories: Challenging our Prejudices. *Paraconsistency: Logic and Applications*. Koji Tanaka, Franz Berto, Edwin Mares and Paoli Francesco (eds.). Berlin: Springer.

2012 God 'Promptly Vanished in a Puff of Logic'. *Philosophy and The Hitchhiker's Guide to the Galaxy.* Nicholas Joll (ed.). London: Palgrave. 185 – 212.

2007 Some Philosophical Issues Concerning the Confidence in Confident Learning Theory. *Induction, Algorithmic Learning Theory and Philosophy*. Dordrecht: Springer. 179 – 197.

2007 Introduction to the Philosophy and Mathematics of Algorithmic Learning Theory. *Induction, Algorithmic Learning Theory and Philosophy*. Co-written with Harizanov and Goethe. Dordrecht: Springer. 1 – 24.

2005 Introduction. *Boole's Laws of Thought.* Barnes and Noble Books. ix – xvii.

Peer Reviewed Articles

Submitted Dec. 2019. "Disturbing Truth; Sirens of Scepticism"

Submitted Dec. 2019. Reviewed and asked to re-submit: A Footbridge Between Macro-Chemistry and Biology by means of a Formal Language for Conceptual Analysis". HYLE

2019 "A Policy Compass for Ecological Economics". *Ecological Economics and Social Economic Movements: Science policy and challenges to global processes in a troubled world.* Autonomous Metropolitan University of Mexico. Pp. 71 – 88.

2019 "The Beginnings of a Formal Language for Conceptual Analysis of processes in Macro-Chemistry" For a special issue of *Foundations of Chemistry* edited by Eric Scerri and dedicated to Geoffrey Blumenthal, published with Springer Nature. Vol.22, Nº1. Pp. 31 – 42. DOI 10.1007/s10698-019-09343-6.

2019 "Distances between formal theories". Co-written with Mohamed Khaled, Koen Lefever and Gergely Székely. *The Review of Symbolic Logic* Vol. 122. Pp. 1 – 22.

2017 "Inconsistency in Mathematics and Chemistry", Special issue of HumanaMente Vol. 32 *Beyond toleration? Inconsistency and pluralism in the empirical sciences.* (Luis Estrada-González and María del Rosario Martínez-Ordaz eds.) ISSN: 1972 – 1293. pp. 31 – 51.

2017 Varieties of Pluralism and Objectivity in Mathematics, in *Mathematical Pluralism*, Special Issue of the Journal of the Indian Council of Philosophical Research, Mihir Chakraborty and Michèle Friend (Guest Editors) Springer. JICPR Vol. 34.2 pp. 425 – 442. DOI 10.1007/s40961-061-0085-3. ISSN: 0970-7794. pp. 425 – 442.

2017 Co-written with Mihir Chakraborty. Preface. *Mathematical Pluralism*, Special Issue of the Journal of the Indian Council of Philosophical Research, Mihir Chakraborty and Michèle Friend (Guest Editors) Springer. JICPR Vol. 34.2 pp. 205-7. DOI 10.1007/s40961-017-0106-x. ISSN: 0970-7794. pp. 205 – 207.

2016 Co-written with Daniele Molinini. 'Using Mathematics to Explain a Scientific Theory' *Philosophia Mathematica.* Vol. 24, issue 2, June 2016. DOI: 10.1093/philmat/nkv022 pp. 185 – 213.

2015 On the Epistemological Significance of the Hungarian Project. *Synthese*, special edition: Logic and Relativity Theory. Vol. 192, Issue 7 (2015), pp. 2035-2051 DOI 10.1007/s11229-014-0608-x

2013 'Embracing the Crisis in the Foundations of Mathematics' in *La Crise des fondements: quelle crise?* François Lepage & Karine Fradet (eds.) Les Cahiers d'Ithaque *Revue de philosophie de l'Université de Montréal*. Pp. 27 – 43.

2011 Are Mathematicians Better Described as Formalists or Pluralists? Co-written with Andrea Pedeferri. *L&PS – Logic and Philosophy of Science*. Vol.IX, No.1.

2011 An Analysis of the Notion of Rigour in Mathematical Proof. Co-written with Andrea Pedeferri. L&PS – *Logic and Philosophy of Science*. Vol.IX, No.1.

2010 Confronting Ideals of Proof with the Ways of Proving of the Research Mathematician. Co-written with Norma B. Goethe. *Studia Logica* Volume 96, Number 2. 273-288.

2010 Boole: From Calculating Numbers to Calculating Thoughts. Ferreira, F., Löwe, B., Mayordomo, E., Gomes, L.M. (eds.) *Programs, Proofs and Processes; 6th Annual Conference on Computability in Europe; Ponta Delgada, Azores Portugal, June/July 2010, Proceedings.* Springer: Berlin 2010. 172-179.

2006 Meinongian Structuralism. *The logica yearbook '05*, Praha. 71 – 84.

2005 Klasična dresura kot oblika umetnosti (Classical Dressage as a Form of Art). Trans. into Slovene by Lev Kreft. *Borec*. *Revija za Zgodovino, Antropologijo in Književnost* 626 – 629 LVII. 230 – 253.

Reviews

2012 Stewart Shapiro. Mathematics and objectivity. Polkinghorne, John (ed.). *Meaning in mathematics*. Oxford: Oxford University Press (2011). 97-108. Zentralblatt: Zbl pre05953897.

2012 Gideon Rosen. Comment on Stewart Shapiro's 'Mathematics and objectivity'. Polkinghorne, John (ed.). *Meaning in mathematics*. Oxford: Oxford University Press (2011). 109-111. Zentralblatt: Zbl pre05953898.

2012 Bar-Am's Extensionalism; The Revolution in Logic. *Philosophy of the Social Sciences*. Vol. 42. Issue 1.

2002 Shapiro's Philosophy of Mathematics. *Philosophical Quarterly*, Vol. 52, Issue 207.

2000 Comparative review of Tomassi's *Logic* and Cauman's *First-Order Logic*. *Philosophy in Review* Vol. XX.

1999 Nef & Vernant (eds.) *Le formalisme en question; le tournant des années 30*. *HOPOS* Vol. V, Issue 2.

Conferences, Seminars and Workshops

Invited Presentations

2021 "The Andréka-Németi group in the Footsteps of Hilbert" 3rd World Logic Day, Budapest, Rényi Institute, 14 January.

2019 "Disturbing Truth" CLMPST (16th International Congress on Logic, Methodology and Philosophy of Science and Technology) Prague.

2019 "The Rigour of Proof". University Seminar: Logic Across the Disciplines. George Washington University.

2019 "The Rigour of Proofs". Philosophy of Mathematics, Special Interest Group of the Mathematical Association of America. This was a special interest group which took part in the American Mathematical Association Meeting.

2018 "Present-Day Hilbertian Science" CNRS (Centre National de Recherche Scientifique): Seminaire de l'IHPST (Institut d'Histoire et de Philosophie des Sciences et des Techniques), Paris.

2018 "In the Footsteps of Hilbert; The Logical Foundations of the Relativity Theories" Humbolt University, Berlin.

2018 "Mathematical Explanations in Science" Workshop on Mathematics and Culture II. Institute for Studies in Science, Technology and Culture (ISSTaC) in association with the Department of Humanities and Social Science IIEST (Indian Institute of Engineering, Science and Technology) Shibpur. Kolkata.

2018 "Environmental Economics and Ecological Economics" Faculty, Department of Humanities and Social Science IIEST Shibpur. Kolkata.

2018 "A Next Step: Marrying Quality and Quantity for Policy Decisions" Plenary Lecture. Fifth International Conference on Emerging Applications of Information Technology (EAIT 2018). IIEST, Sibpur, Kolkata.

2017 "Reasoning Abhorrently" Logic Colloquium 2017, Stockholm. Special Session on Philosophical Logic.

2017 "Philosophy, Science Education and Tolerance", Panel Discussion, organised by Stuart Umpleby, International Society for Systems Science 2017, Vienna.

2017 "Physical Observations as Eigenforms", From Foundations to Applications; Workshop in the Philosophy of Mathematics, Università Vita-Salute San Raffaele, Milano.

2017 "A Policy Compass for Ecological Economics", Workshop on The System of Accounts for Global Entropy Production. International Society for Systems Science 2017, Vienna.

2017 “Ecologically Sound Practice in Chemistry”. ISPC (International Society for Philosophy of Chemistry). Paris.

2017 “Mathematical Pluralism: What is it?” Reasoning Seminar, Faculdade de Ciéncias da Universidade de Lisboa.

2017 “A Pluralist Mathematical Practice” Lecture at the VUB (Vrej Universitat Brussels) as part of the strategic research project on Logic and Philosophy of Mathematical Practices of the Centre for Logic and Philosophy of Science, organised by the Ghent-Brussels Alliance.

2017 “Rational Reconstructions: Making sense of Proofs with Inconsistent Premises”. Workshop organised by the Centrum voor Logica en Watenschapsfilosofie, VUB (Vreij Universitat Brussels. Logic and Philosophy of Mathematical Practices.
Also presented Seminário de Lógica Matemática, Grupo de Lógica Matemática at the Faculdade de Ciéncias da Universidade de Lisboa.

2016 “Inconsistent Proofs”. Mexican Philosophy Congress. San Cristobal de las Casas, Chiapas, Mexico.

2016 “Inconsistency in Mathematics and Chemistry” Workshop: The Place of Inconsistent Science in Scientific Pluralism, UNAM (Autonomous National University of Mexico).

2016 “A Tool for Policy Analysis: Aggregating Qualitative Indicators to Develop Robust, Defensible and Adaptive Policies” University Seminar on Reflexive Systems, George Washington University, Washington D.C.

2016 “Is the Pluralist Reconciliation between Nominalism and Platonism too Easy?” Conference on: Reconciling Nominalism and Platonism, Columbia University, New York.

2016 “Pluralism Versus Monism in Science” Workshop on Reflexive Systems in Science, George Washington University.

2015 Set theory and pluralism. Talk given to the Calcutta Logic Circle. Jadavpur University, Kolkata.

2015 Varieties of Pluralism. Two workshops on Pluralism in Mathematics, one at the *Universidad Nacional Autónoma de México, El Instituto de Investigaciones Filosóficas* (September). The other at the *Asutosh Mookherjee Science Centre* in Kolkata, India (December).

2015 Paradoxes of Pluralism. Two workshops on Pluralism in Mathematics, one at the *Universidad Nacional Autónoma de México, El Instituto de Investigaciones Filosóficas* (September). The other at the *Asutosh Mookherjee Science Centre* in Kolkata, India (December).

2014 'The Existence of Sets and a Non-Ontological View of Objectivity'. James Madison University, Harrisonburg, Visginia, U.S.A. Workshop on The Existence of Sets.

2012 'Three Conceptions of Proof: the Genetic, Reductionist and Rational Reconstruction Conceptions'. Universidade Federal do Rio Grande do Norte. Natal, Brazil.

2012 'Three Conceptions of Proof: the Genetic, Reductionist and Rational Reconstruction Conceptions'. Pontifica Universidade Católica do Rio. Rio de Janeiro, Brazil.

2011 'Embracing the Crisis in the Foundations of Mathematics'. *Atelier sur la Crise des Fondements des Mathématiques*. Université de Montréal. Montréal, Canada.

2010 'Of Logic, Reasoning and Computers'. *Foundations of Logical Consequence Seminar, Arché.* University of St. Andrews. St. Andrews, Scotland.

2010 'Boole: From Calculating Numbers to Calculating Thoughts'. *CiE (Computation in Europe).* Ponta Delgada, Azores, Portugal.

2010 'A Pluralist Approach to Proof in Mathematics'. *PhiMSAMP - 6, (Philosophy of Mathematics: Sociological Aspects and Mathematical Practice),* Amsterdam, The Netherlands.

2010 'A Pluralist Approach to Proof in Mathematics'. *Mathematics Department, Logic Colloquium, the George Washington University*. Washington D.C., U.S.A.

2010 'A Pluralist Approach to Proof in Mathematics'. *Philosophy department, George Washington University*. Washington D.C., U.S.A.

2008 'Constructivism and Realism in Mathematics'. *Graduate student forum, Mathematics Department, George Washington University.* Washington D.C., U.S.A.

2007 'Ecological Economics and Environmental Economics'. *George Washington University Philosophy Club.* Washington D.C., U.S.A.

2006 'Collaboration Between Mathematics and Philosophy: Current and Future Developments at the George Washington University'. *Workshop organised by Dean Frawley, George Washington University*. Washington D.C., U.S.A.

2005 'So What is Wrong with Contradictions Anyhow?' *University of Hertforshire*. London, U.K.

2005 'The Next Step After Structuralism in Mathematics'. *University of Hertfordshire*. London, U.K.

1996 'Second-Order Logic and Logicism I'. *Computational Science Department of the University of Debrecen*. Debrecen, Hungary.

1996 'Second-Order Logic and Logicism II'. *Computational Science Department of the University of Debrecen*. Debrecen, Hungary.

Refereed Conference Presentations

Postponed. August 2020 (abstract accepted) A Formal Language for Analysing Reasoning in Macro-Chemistry, for the symposium: Taking the Defects of Human Rationality Seriously: Views from Epistemology, Logic and Cognitive Science; in the European Society for Analytical Philosophy meeting in Utrecht 24 – 28 August.

2020 The Institutional Compass and its Relevance to Systems Science. Online presentation to a weekly seminar in systems science.

2019 A Formal Language for Conceptual Analysis in Macro-Chemistry and Thermodynamics. International Society for the Philosophy of Chemistry. Torino.

2019 Conceptual Analysis in Biology and Chemistry, Using a Formal Language. Bridging the Philosophies of Biology and Chemistry. Paris.

2019 A Tribute to Michael Makkai; From a naïve Student's point of view. Logic, Categories and Philosophy of Mathematics. Budapest.

2019 The Policy Compass Adapted for Ecological Economics. CANSEE. Waterloo, Ont. Canada.

2018 Using a Policy Compass for Staying within Sustainability Parameters. ISEE 2018, Mexico. International Society for Ecological Economics.

2018 "A Formal Representation of Reasoning in Chemistry" ISPC 2018 (international Society for the Philosophy of Chemistry). Bristol.

2018 "A Formal Representation of Reasoning in Chemistry" UNILOG 2018. Vichy.

2017 "Physical Phenomena as Eigenforms" Logic, Relativity Theory and Beyond 2017. Budapest.

2017 "Sound Ecological Practice in Chemistry" ISPC (International Society for Philosophy of Chemistry) Paris.

2016 Inconsistent Proofs. Pluralidad, Justicia y Paz; XVIII Congreso International de Filosofía, Asociatión de Filosófica de México A.C., San Cristóbal de las Casas, Chiapas, México.

2016 Inconsistency in Mathematics and Science. Trends in Logic XVI, Campinas, Brazil.

2016 An Aggregated Qualitative Accounting Method for Developing Justified Policies. International Society for Systems Science. Boulder Colorado, U.S.A.

2016 An Aggregated Qualitative Accounting Method for Developing Justified Policies. *International Society for Ecological Economics*. Washington D.C., U.S.A.

2016 Guna Accounting. Part of panel for a conference: *Ecology, Globalisation and Human Rights*. Maynaguri College, North Bengal, India.

2015 Pluralist Mathematical Practice. CLMPS, Helsinki and *Second International Conference on Logic and Relativity; and Beyond*. Rényi Institute of Mathematics. Budapest, Hungary.

2013 'Using a Paraconsistent Logic Metaphorically'. Logic Colloquium, Evora, Portugal, and Second International Meeting of the Association for the Philosophy of Mathematical Practice, Urbana Illinois, USA.

2013 'Introducing a Rigorous Tool for Reasoning Under Uncertainty'. Russian Society for Ecological Economics, Irkutsk, Russia.

2012 'The Epistemological Significance of Grounding Relativity Theories in Set Theory'. *First International Conference on Logic and Relativity; Honouring István Németi's 70th Birthday*. Rényi Institute of Mathematics. Budapest, Hungary.

2012 'Genetic Proofs, Reductions and Rational Reconstruction Proofs'. *Logic Colloquium 2012*. Manchester, U.K.

2012 'Who is this Character *Homo Ecologicus*?' *International Society for Ecological Economics.* Rio de Janeiro, Brazil.

2011 'Presenting Pluralism in Mathematics'. *Joint Session 2011*, University of Sussex. Lewes, U.K.

2011 'Presenting Pluralism in Mathematics'. *14th Congress of Logic, Methodology and Philosophy of Science.* Nancy, France.

2010 'An Analysis of the Notion of Rigour in Proof'. *SiLFS (Società Italiana di Logica e Filosofia delle Scienze* (Italian Society for Logic and Philosophy of Science)) *International Conference 2010.* Bergamo, Italy.

2010 'An Analysis of the Notion of Rigor in Mathematical Proof.' *Logic Colloquium 2010*, Paris, France.

2009 ‘Confronting Ideals of Proof with the Ways of Proving of the Research Mathematician’. Co-authored with Norma B. Goethe. *PhilMath Workshop University of Notre Dame*, Southbend, U.S.A.

2009 ‘Some Problems with Naturalism in Mathematics’. *Logic Colloquium 2009*. Sofia, Bulgaria.

2009 ‘A Logic for the Measurement of Entropy Production in Ecological Systems: And the Resulting Impact on Human Survival and the Economy’. Jointly presented with Anthony Friend. *ESEE* (European Society for Ecological Economics). Ljubljana, Slovenia.

2009 ‘A Logic for the Measurement of Entropy Production in Ecological Systems: And the Resulting Impact on Human Survival and the Economy’. Jointly presented with Anthony Friend. *USSEE* (United States Society for Ecological Economics). Washington D.C., U.S.A.

2008 ‘Pluralism and “Bad” Mathematical Theories: Challenging our Prejudices’. *Fourth World Congress on Paraconsistency*, Melbourne, Australia.

2008 ‘Pluralism and “Bad” Mathematical Theories: Challenging our Prejudices’. *Impredicativity Club*. Washington D.C., U.S.A.

2008 ‘The Relationship Between Mathematicians and Philosophers; Or should Mathematicians Listen to Philosophers at All?’ *Australasian Association of Philosophy Annual Meeting*. Melbourne, Australia.

2006 ‘The Relationship Between Mathematicians and Philosophers; Or should Mathematicians Listen to Philosophers at All?’ *Association of Symbolic Logic European Summer Meeting*. Nijmegen, The Netherlands.

2005 ‘The Next Step for Structuralism’. *Logica ’05*, Hejnice, Czech Republic.

2005 ‘Classical Dressage as a Form of Art’. *British Philosophy of Sport Association Annual Meeting*, Durham, U.K.

2003 ‘The Misplaced Confidence in ‘Confident’ Learning’. *12th Congress of Logic, Methodology and Philosophy of Science*. Oviedo, Spain.

2003 ‘The Misplaced Confidence in ‘Confident’ Learning’. *Association of Symbolic Logic European Summer Meeting.* Helsinki, Finland.

2002 ‘What a Proof Guarantees for Frege’. *HOPOS*. Vancouver, Canada.

2002 ‘What a Proof Guarantees for Frege’. *Logic Colloquium, Mathematics Department, George Washington University*. Washington D.C., U.S.A.

2001 'What a Proof Guarantees for Frege'. *European Summer Meeting of the Association of Symbolic Logic.* Paris, France.

2001 'What a Proof Guarantees for Frege'. *Philosophy Department, George Washington University*. Washington D.C., U.S.A.

2000 'Are Frege's Gapless Proofs Effective?' *European Summer Meeting of the Association of Symbolic Logic.* Association of Symbolic Logic European Summer Meeting July 2000. Vienna, Austria.

1999 'A *Reductio ad Absurdum* Argument for Logicism'. *British Society for the Philosophy of Science Meeting*. Sheffield, U.K.

1999 'Classical Dressage as a Form of Art'. *Aesthetics and the Body*, Uppsala, Sweden.

1998 'Summary and critique of two chapters of Nagel's book: *The Last Word*.' *Cross-university staff and student reading group*. London, U.K.

1994 'Hume's Principle and Parities'. *Conference on Second-Order Logic*, University of Warsaw, Warsaw, Poland.

1993 'Limitative Results and their Philosophical Significance'. *University of Edinburgh, research seminar on Frege's Philosophy of Mathematics*. Edinburgh, Scotland.

Other Sorts of Academic Presentation

2018 Possible Worlds. Lecture to students participating in the John Locke Programme for students in a gap year between secondary school and university.

2017-8 Series of three lectures on philosophy of logic and mathematics to students at Department of Humanities and Social Science Shibpur. Howrah, India.

2016 "Are Laws Necessary for Relativity Theory?" Research Seminar Institute of Philosophical Research, National Autonomous University of Mexico, Mexico City, Mexico.

2016 "Infinity" Presentation to the undergraduate students in the department of philosophy, National Autonomous University of Mexico, Mexico City, Mexico.

2016 "From Realism to Pluralism in Mathematics". Presentation to the undergraduate students in the department of philosophy, National Autonomous University of Mexico, Mexico City, Mexico.

2012 'Participation and Impressions: the International Society for Ecological Economics Meeting in Rio de Janeiro' Television Interview. Brazil National Television.

2006 'Boole's "Laws of Thought"' Television Interview. *The Scholar's Chair*. Prince George's County television.

External Examiner/ Ph.D. Supervision

2021 February – August Visiting on ERASMUS+ Yaman Abdin: *Philosophy of Pharmachology*, Saarland University, Germany.

2018 – 2021 Second supervisor for Stefan Steins *Pluralism, Constructive Mathematics and Economics*, Humboldt University, Berlin, Germany.

2020 M.A. David Martie The Non-Linear Dynamics of the Varlik Vergisi (Turkish Wealth Tax). Elliot School of International Affaires, George Washington University.

2017 Ph.D. Marina Imocrante. Philosophy of Mathematics: Epistemologies and Applicability. San Raffaele University, Milano and UniSR, Paris I.

2017 Ph.D. Koen Lefever. *Using Logical Interpretation and Definitional Equivalence to Compare Classical Kinematics and Special Relativity Theory*. Vrije Universiteit Brussel.

2017 M.A. Sarah Holmes. Prize-linked savings: Balancing near-term gains with long-term consequences. George Washington University.

2003 – 2015. Examiner for 6 Ph.D. students of mathematics at the George Washington University.

Courses Taught

Graduate

Philosophy, Policy and the Environment. (George Washington University)
Philosophy of Chemistry (George Washington University)
Tutor for Metaphysics (London School of Economics)

Undergraduate

(Centrale Lille):
Bio-Economie.

(George Washington University)**:**
Proseminar on Philosophy of the Environment and Policy,
Proseminar on Metaphysics: Determinism and Indeterminism,

Proseminar on Logical Pluralism,
Perspectives on the History and Philosophy of Science and Mathematics,
Advanced Logic,
Philosophy of Mathematics,
Symbolic Logic,
Introduction to logic,
Advanced critical thinking,
Philosophy of Chemistry,
Philosophy of the environment.

(Other Universities):
Metaphysics,
Philosophy of Science,
Philosophy of language,
Introduction to Logic,
Epistemology.

Courses I should also like to teach but have never taught

History of Mathematics,
Rationality,
Martin-Löf Type Theory and Constructive Foundations
History and Philosophy of Economics, with an emphasis on ecological economics,
Philosophy of Statistics and Big Data.

Voluntarily taught book-reading courses often with other faculty auditing the course (George Washington University)

Garfield: Engaging Buddhism
Priest: Beyond the Limits of Thought,
Nait-Abdallah: The logic of Partial information,
Németi et. al.: Logical Foundations of Special Relativity,
Husserl: Ideen
History of Logicism,
Brouwer and Hilbert,
Frege: *Begriffsschrift*,
Maddy: Naturalism,
Maddy: Second Philosophy
Tennant: The Taming of the True
Shapiro: Structuralism.

Service to the Philosophical Community

2018, 2019, 2020 Project reviewer for national research, development and innovation office, Hungary.

Professional Memberships

Center for Quantum Computing, Information, Logic and Topology, Washington D.C.
International Society for the Philosophy of Chemistry
Asociación Filosófica de México A.C.
The American Philosophical Association
The American Mathematical Society
International Society for Ecological Economics
International Society for Systems Science
The Association of Symbolic Logic
CiE: Computability in Europe

Books Reviewed for Publishers

2016 Carlo Cellucci: *Rethinking Knowledge: The Heuristic View* Springer.

2012 Petr Vopenca: *The Great Illusion of 20th Century Mathematics, and its New Foundations*. Springer.

2000 Gerrard Wolff: *Unifying, Computing and Cognition: The S.P. Theory and its Applications*. Elsevier BP.

Reviewer for Journals

Foundations of Science 2020, 2018, 2017.

Special Issue on Mathematical Pluralism Vol. 33.3 of The Journal for the Indian Council of Philosophical Research, 2017.

European Journal for the Philosophy of Science

Zentralblatt Math, Edited by the European Mathematical Society. Heidelburg Academy of Sciences and Fachinformationszentrum, Karlsruhe.

Synthese, an international journal for epistemology, methodology and philosophy of science. Springer. 2021, 2019, 2018, 2015, 2014.

TopiCS - Topics in Cognitive Science. Wiley-Blackwell. 2013.

Journal for General Philosophy of Science. Springer. 2017.

Ecological Economics, the Transdisciplinary Journal of the International Society for Ecological Economics. Elsevier. 2011.

Organising Conferences

2020 Programme Committee. *Logic, Relativity Theory and Beyond*, Budapest, Hungary.

2018 Programme Committee International Society for the Philosophy of Chemistry (Bristol, U.K.)

2018 Programme Committee UNILOG (Vichy, France).

2018 Co-organising with Mihir Chakraborty and Subhasis Nibirth an International Workshop in Kolkata, India, January)

2017 Scientific Committee. *Novembertagung Conference: On the History and Philosophy of Mathematics.* Brussels, November 2017.

2017 Programme Committee. *Logical Foundations of Relativity Theory and Beyond*. Budapest, August 2017.

2015 Programme Committee. *Logical Foundations of Relativity Theory and Beyond*. Budapest, August 2015.

2012 Special Session. *The Legacy of Gödel's Second Incompleteness Theorem for the Foundations of Mathematics*. Co-organised with Joe Mourad. American Mathematical Society 1080th Meeting. George Washington University. Washington D.C.

2010 Co-Organiser for the Association of Symbolic Logic Meeting in Washington D.C.

2002 Organised a panel discussion at the HOPOS conference. The panel was composed of scholars from Canada, the United States, and Argentina.

1999 Co-organised a conference with Brendan Larvor on Programmes in the Philosophy of Mathematics, University of Hertfordshire.

1996 Scottish Postgraduate Philosophy Association Conference, St. Andrews on Applied Ethics.

1995 British Philosophy of Science Conference, St. Andrews.

1995 Scottish Postgraduate Philosophy Association Conference, St. Andrews on McDowell: Mind and World.

1994 Two-day conference, St. Andrews on Wittgenstein, Philosophy of Language and Philosophy of Mind.

Other

2018 Writing review for applicant to a tenure-track position in the philosophy of mathematics at the University of Athens.

2019 Appointed to the editorial board for *Handbook for Mathematical Philosophy*. Chief editor of the part on Pluralism in Mathematics. Chief Editor of Handbook: Bharath Sriraman. Publication contract with Springer.

2008 - 2013 Forming of "The Impredicativity Club". This is a meeting of professors, students and unaffiliated academics to discuss issues in the philosophy of science, mathematics and logic. The club meets weekly during the academic semesters, and fortnightly otherwise. The club has a blog and is investigating the possibility of editing an on-line journal.

2000 Contributing to the written material used for the Quality Assessment Exercise for the University of Manchester.

Service to George Washington University

2018 Host for Jc Beall's Thacher Lecture.

2018 Serving on CCAS committee to review applications for grants.

2018 Reviewing applications of students to be admitted to the M.A. degree programme in philosophy and policy.

2017 Voluntarily co-teaching Perspectives in Mathematics and Science. This is a course for students who want to qualify to teach science and mathematics in schools in the USA. The GW Teach program is a series of classes aimed at such a qualification.

2017 Mentor for Andrew Bacrau's Honors Thesis.

2014 onwards. Block captain for the department of philosophy of the George Washington University faculty association.

2014 Lecture given to the students of the Philosophy Club at George Washington University on writing a philosophical argument.

2012-13 Mentor for Landon Elkind's Reynolds-Thacher fellowship.

2012 Making a proposal for an interdisciplinary major in logic, reasoning and argument.

2012 Successfully applied for funding to develop an undergraduate course in environmental philosophy as part of the minor in sustainability, and as a GPAC course involving civil engagement.

2012 Developing a course on philosophy of environment at the graduate level.

2011 Co-Organiser for The Elton Lecture George Washington University**.**

2009 Appearing as a "George Washington University Illuminary" for a book signing at the Gellman Library. This was in honour of the co-edited work with Harizanov

2008 – 2011 Organising the logistics and invigilating the "Learningguild" Examination in Writing and Reasoning on 4 occasions. This is a 3 hour examination run from Australia. It is an opportunity for GW students to be tested on their basic writing skills. They receive substantial feedback and a certificate from the "learningguild".

2007 – 2008 Mentor for Thom Genarro's Rice-Thacher fellowship paper**.**

2007 Unofficially helped to organise the Undergraduate Philosophy Student Conference at George Washington University Spring

2006 – 2007 Member of the hiring committee for a joint position between the honours department and the philosophy department.

2006 Member of the hiring committee for two one year appointments for the year Sept. 2007 – June 2008, between them teaching ancient philosophy, logic and introduction to philosophy.

2006 Member of the steering committee for the George Washington University Forum for Academic Applications of Mathematics.

2005 Member of the Hiring Committee for a position in Philosophy of Mind.

2004 – present. Organising the teaching of Logic at The George Washington University, including hiring of undergraduate "Logic Tutors" at the George Washington University..

2004 – 2006 Heading the Writing Coach Programme in the Philosophy Department at George Washington University.

2004 – 2006 Acting as Faculty Advisor to the Philosophy Club at George Washington University.

2004 – 2006 Faculty advisor for the philosophy Honours Society Phi, Sigma, Tau.

2004 Member of the Hiring Committee for a one year contract position teaching Introduction to Philosophy and Introduction to Logic at George Washington University.

2003 – present. Writing letters for "adjunct professors" to get better positions.

2003 – 2010 Co-Organiser for The Michael Thacher Lecture George Washington University

2003 – 2009 Organiser for "Brown-Bag" lectures at George Washington University.

2003 Contributing written portions of the 'Departmental Self-Assessment Report' at the George Washington University.

2003 – present. Honours thesis, M.A., and Ph.D. examiner in both Philosophy and Mathematics Departments.

2001 – present. Writing letters of Recommendation for students.

2001 – present. Running 17 reading and research reading groups. The research groups read a research text in the philosophy of mathematics. The groups are composed of students from GW, and other universities and faculty from GW and other universities. Sometimes we are also joined by people not affiliated with a university.

References All of the following may be contacted at any time for references.

Current Employer

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Acquainted with some of my recent research work, but not collaborators

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Research Plans

In late January 2020 I shall be joining a pilot project at the University of Lille-Nord. The pilot project is on re-conceiving science in the light of the changes in the planet. My research will begin with writing a book giving the method for constructing what I call an "institutional compass". The contract is with Springer. It will be reviewed in the Methodos series. The book will include an original method of data analysis and an original method of representing the data. The method is quite adaptable. In particular, one of the permutations of the compass takes into account the principles of ecological economics. The plan after is to write another book, this time on the formal languages and formal representations I have been developing for conceptual analysis in chemistry.

In the summer of 2020 I hope to organise and host a conference at the university of Lille. It will be a second conference on Creating Bridges between the Philosophies of Biology, Chemistry and the Environment.

I have submitted an abstract for a conference in the summer on extending the Andréka-Németi project. This might lead to a published paper.

The next area of concentration will be to write another book, this time on a formal language for conceptual analysis in macro-chemistry thermodynamics and biology. This will be work, roughly in the Hilbert tradition and in the Andréka-Németi tradition for providing logical foundations for the sciences. These two books should be published or be ready for publication by the end of 2022.

The following project is to investigate big data and deep learning. I shall be collaborating with Ulrich Koch from the school of medicine of George Washington University and Sudip Bose from statistics. We shall be adding a note of caution to the enthusiasm for these two ideas.

Mihir Chakraborty, Reuben Hersh and I are collaborating on a triologue on the philosophy of mathematics. I am chief editor of the section on Pluralist Views of Mathematics, for the Handbook of the Philosophy and Practice of Mathematics.

I continue to work on the Handbook on the History and Philosophy of Mathematical Practice.

Actual and Estimated Impact of my Most Recent Research

The book I published with Springer in 2014 has already had a strong impact. The production manager for the series wrote that "the book on pluralism in mathematics is published in our most prestigious series in the philosophy of science, mathematics and logic". Moreover, he wrote that the success of the book is "unprecedented". On the strength of it, I have been the keynote speaker at two conferences on the topic of mathematical pluralism, one held in Mexico in September 2015, the other in Kolkata in December 2015. I have continued to collaborate with researchers at both institutions, and have been a visiting professor at the Institute for Philosophical Research at UNAM (Universidad Nacional Autonoma de Mexico) the centre for logic and philosophy of science at the Free University of Brussels. I have also been invited to the University of Cordoba in Argentina, again, on the strength of the book, but have not yet found the time to go.

The type of impact the book is having is due to its putting a well-worked out philosophical, or meta-philosophical position, that is 'in the air'. That is, pluralism in mathematics is thoroughgoing in the practice of mathematics, some philosophers of mathematics recognised this implicitly, but did not have a well-worked out philosophical position to draw on

for support. They, therefore, worked on projects piecemeal, pointing out an anomaly here, or how this particular practice in mathematics does not support a particular, more traditional, philosophy of mathematics. Now, because there is a well worked out position supporting their work they can make their points in a clearer way.

The paper co-written with Daniele Molinini, and published in *Philosophia Mathematica*, is also having a strong impact in the debate in philosophy of science concerning the dispensability of mathematics in explanations in science. Presently, the debate concerns whether or not it is always possible, in principle, to dispense with mathematics in what are presented as explanations of scientific phenomena. The paper we published undermines the whole debate, or rather, shifts the quantifiers and sentential operators. In the paper we review the work of the Andréka-Németi group of logicians, mathematicians and physicists, who present a purely mathematical explanation for whole scientific theories: namely special relativity theory and general relativity theory. So rather than ask: "Is it *possible* to *dispense* with each particular mathematical part of a purported explanation in science?", in light of the evidence we present, the new question is: "Is it *desirable* to explain *whole theories* using *only* mathematics?" There is a modal and quantifier shift between the two questions.

If it is noticed and taken seriously, then the institutional compass will bring a much greater depth to policy. In particular, the: criticism, judgment, justification and responsibility of policy makers will be much more systematic and robust. Being taken seriously depends on implementation and experiment within institutions, and presently, I am not in a position to carry out such applications.

The formal language for conceptual analysis in chemistry work is being closely scrutinised by the research group at the University of Buenos Aires headed by Olimpia Lombardy and by Giuseppe Restrepo at the Max Planck Institute in Munich.

Statement of Teaching Philosophy

My approach and philosophy in particular courses changes with the topic, the level and the desires and background of the students. However, there are some general remarks I can make. At the lower levels, I think it is important for the students to learn some material and become familiar with it, so that they 'own it' or 'appropriate it'. For this, they have to learn to read very carefully, so that they really know *what* it is they are learning. But they also have to manipulate the concepts, be able to apply them in new situations. As the students progress to the higher levels, I very much want them to develop *their own* approaches and *their own* philosophical points of view. But here, 'develop' means writing out arguments that can stand up to criticism. So, the position must be stable and robust. Thus, I also take my role of evaluating the students very seriously. They are evaluated for the quality of their arguments, and for the quality and clarity of their writing and oral presentations. It does not matter to me what position they adopt. It can be a very different position from my own, in fact, I find this quite delightful, but what I hope that they will also have learned is the importance of constructive criticism and the importance of debate, where the importance is not to win, so much as to either strengthen one's position or to change one's mind in light of better arguments or insights. I also hope to transmit to students that being able to do the latter is a mark of maturity and confidence, not of weakness.

I want the students to use the material learned in class to apply to other courses. In fact, I want much more than this. I want the students to learn new ways of seeing the world around them, to become sensitive to things they would not have noticed otherwise, such as ambiguities, other points of view, a greater variety of concepts. They should understand how to use the ideas and approaches learned in philosophy to question institutional ideas, and their own prejudices. Moreover, they should know how to sustain a question and pursue an outcome, and accept a nuanced and sensitive 'resolution', as opposed to a 'yes/ no' solution. They should also develop their curiosity, and their courage to look into very difficult questions or read very difficult texts. I want them to have the courage to ask very fundamental questions, and to remind others of things that they are overlooking, with the tact to do so constructively. A colleague of mine recently said that he admired my ability to make the driest and most difficult subjects fascinating to students.