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INTRODUCTION: PERSONAL INFORMATION AND CURRENT RESEARCH

0.1. UNIVERSITY EDUCATION

1969 B.A. (with Distinction in Economics and Mathematics), University of Zambia.
1972 M. Phil. (Economics), Nuffield College, University of Oxford.
1975 D. Phil. (Economics), Nuffield College, University of Oxford.

0.2. MAJOR APPOINTMENTS

1975-76: Lecturer, University of Buckingham, United Kingdom
1976-77: Assistant Professor, University of Saskatchewan, Canada
1977-81: Associate Professor, University of Saskatchewan, Canada
1981-86: Associate Professor, Brock University, Canada
1987-2014 Full Professor, Brock University, Canada
2014-to present: Emeritus Professor, Brock University, Canada

0.3. OTHER VISITING APPOINTMENTS

April-Sept., 1980: Senior Associate Member, St. Antony's College, Oxford
1984-1985: Visiting Scholar, Cambridge University and Jesus College, Cambridge.
1991-1992: Visiting Fellow, Cornell University, Ithaca, NY
1992-1995: Adjunct Professor, Cornell University, Ithaca, NY
Nov. 1994: Short-Term Visiting Fellow, University College, London

0.4. AWARDS AND DISTINCTIONS

1. Appointed to *Standards Council of Canada, Canadian Advisory Committee to International Standards Organization, TC 251 - Asset Management, January 2011-2014*. (Developing a standard for Asset management for Infrastructure such as water).
2. Appointed to the *CSA Technical Committee on Water Quality Management Systems, S2029, 2008-2014*.
3. *Brock University Distinguished Research Award for 2002*.

0.5. CURRENT RESEARCH IN PROGRESS

1. Factors driving investment and growth of Private Equity in the U.S.: a Topics Modelling approach. [with Ernest Biktimirov, under review at a journal, April 2026]

2. Accelerating Climate Impacts in Two adjacent Biomes: Taiga and the Tundra, a survey. [With Francine McCarthy. Under preparation]
3. Adapting to climate change: the Lake Ontario Coastal Resilience Pilot Project. An assessment—necessary conditions for successful implementation. [Under preparation]

0.6. CAREER PUBLICATIONS SUMMARY

Single-authored books	4
Edited books	4
Refereed articles	78
Non-refereed articles	31
Major external research grants	25

0.7 RESEARCH SUMMARY STATEMENT

My areas of research have been statistical analysis of climate change and the need for adaptation policies for infrastructure over the next 50 years. In 2023 Canada adopted a National Adaptation Strategy which is now being implemented. One major impact of climate change will be on water resources, affecting seasonal quantity and quality. Adapting all water and other infrastructure to climate change will require major investments. The variation in the availability of water could lead to a new threat: the unilateral acquisition by the US of Canadian Great Lakes waters through the existing 'Chicago Diversion.' The further melting in the Arctic will increase shipping and military activity and bring more environmental damage to ecosystems in the North. *This development is now part of my current research.* Geologists have suggested that the global degradation of our planet defines the start of the *Anthropocene Epoch* and the end of the *Holocene Epoch*. The evidence for this claim has been well established through geological sediment core samples taken over the world, including at Crawford Lake, Canada. The date proposed for that change is 1952. However, the International Union of Geological Sciences has yet to endorse that date. Our 2026 paper in *The Anthropocene Review* statistically corroborates 1952 as the start of the new epoch by examining statistical time series data from the air, the oceans and land, and it sums up a great deal of environmental change. However, new impacts, such as slowing ocean currents and the slowing of the earth's rotation, are still being researched by scientists. Their combined impacts are yet not fully known. Taken as a whole, this research draws increased attention to environmental conditions that require global action.

RESEARCH TOPIC 1: CLIMATE CHANGE & PRECIPITATION PATTERNS

TOPIC 1 A: REFEREED ARTICLES

1. "Understanding the end of the Holocene: a non-parametric statistical approach." (with Manuel R. Marin, & F.M. McCarthy). *The Anthropocene Review*, 2026, pp. 1-23. This is a statistical analysis of several time series to find the best evidence to determine when the Holocene ended. The analysis supports 1952 as the start of the epoch.
<https://doi.org/10.1177/20530196261438442>
2. "Detecting and quantifying structural breaks in climate." (Co-authored with Neil R. Ericsson and Hassan Butt). *Econometrics* 10, no. 4 (2022): 33. This work is cited within the niche of climate econometrics, specifically regarding time-series analysis of climate data.
3. "The changing pattern of precipitation at the Sooke reservoir in British Columbia." (with M. Ruiz and M. Matilla), in *Atlantic Economic Journal*, 2013, 41 (2), pp.97-113. The paper is a parametric and nonparametric analysis of 90 years of daily precipitation data at the Sooke Reservoir in British Columbia, Canada, for evidence of climate change. The results show that rainfall has become more extreme and less stable, directly confirming the change in long-term climate patterns on the reservoir. <https://doi.org/10.1007/s11293-012-9346-y>
4. "A Question of Fudge: Professor Nordhaus on Climate Change Policy," in *World Economics: The Journal of Current Economic Analysis and Policy* (Oxford), 2009. Vol. 10, Issue # 1, pp 91-106. This paper is a critique of William Nordhaus' book *A Question of Balance* (2008), in which he proposes his optimal policy for dealing with global climate change. The structure of Nordhaus model, which requires marginal costs be equal to marginal benefits everywhere and at all time periods, overlooks the scale and complexity of the problem. Nordhaus's model bases its discount rate on the opportunity cost of private capital, unfairly devaluing the well-being of future generations. Finally, Nordhaus fails to properly treat climate change as a global public good, leading to an inefficient policy framework compared to other approaches like the Stern Review.
5. "Estimating Baselines for Climate Change for Less Developed Countries: the Case of the Sahel." (with J.F. Lamarche) *Climate Policy*, Issue 6/2, pp. 231-240, 2006. The paper proposes a method to estimate precise statistical baselines for climate change impacts in Less Developed Countries (LDCs), an essential step for accessing assistance under the UN Framework Convention

on Climate Change (UNFCCC) and the Kyoto Protocol.
<https://doi.org/10.1080/14693062.2006.9685597>

6. "Climate Change and Changes in Global Precipitation Patterns: What Do We Know?" *Environment International*, 2005, Vol. 31, No.8 pp. 1167-1181. (921 Citation Indexes, [26 Policy Citations](#), PLUMX; 1311 Citations, ResearchGate). This paper corroborates research reported in our 2001 study. It is one of the highly visible papers, frequently cited by climate modelers, environmental researchers, and policymakers looking for regional and continental syntheses of increased precipitation variance. <http://doi.org/10.1016/j.envint.2005.03.004>

TOPIC 1B: THE COST OF ADAPTATION TO CLIMATE CHANGE

1. **BOOK-LENGTH REPORT:** *The Cost of Adaptation to Climate Change in Canada: A Stratified Estimate by Sectors and Regions. Social Infrastructure*, April 17, 2001. In: [PDF] *The Costs of Adaptation to Climate Change in Canada: A Stratified Estimate by Sectors and Regions* by MHI Dore, I Burton. **This report is a groundbreaking study funded by the Canadian Climate Change Action Fund.** The study provides one of the foundational frameworks for estimating adaptation costs across various Canadian economic sectors and regions, focusing heavily on social impacts on infrastructure, water management. Available at: www.academia.edu
2. "Global Warming, Substitutability and Discounting: a Comment." *Energy Policy*, March 2000, Vol. 28, No 2: 77-79. The comment builds on the argument that environmental services, such as a stable climate, cannot be replaced by manufactured capital, making the discounting of distant catastrophic climate impacts invalid. This perspective challenges Eric Neumayer's assertion that the debate should focus on the substitutability of natural capital rather than standard economic discounting.

POLICY ACTION & IMPACT: After years of delay, in June 2023, Canada formally promulgated its "National Adaptation Strategy" and made funds available for adaptation. For example, Niagara Peninsula Conservation Authority is implementing a pilot project on adaptation of the shoreline of Lake Ontario, and Brock University will be involved in monitoring progress.

RESEARCH TOPIC 2: ADAPTATION TO CLIMATE CHANGE THROUGH SUSTAINABLE FORESTRY, COMMUNITY RESILIENCE & PUBLIC POLICY

TOPIC 2A: REFEREED ARTICLES

1. "Valuing Forests: a Selective Survey," *Nonlinear Dynamics, Psychology and Life Sciences*, Vol. 13, Number 3, April 2005. The paper explores the nonlinear complexities of placing economic values on forest ecosystems, addressing the intersection of environmental economics and complex ecological systems, such as ecological thresholds, non-market valuation, and policy integration.
2. "Forecasting The Conditional Probabilities of Natural Disasters in Canada as a Guide for Disaster Preparedness," *Natural Hazards*, March 2003, Volume 28, Issue 2-3, pp. 249-269. This paper describes the main characteristics of natural disasters in Canada and presents a methodology that is a first attempt to use the database to forecast conditional probabilities of each type of natural disaster. The key results of this methodology are that Hydrometeorological Disasters are increasing over time and the ranking in order of priority for preparedness should be droughts, heat waves, floods and ice storms.
<https://doi.org/10.1023/A:1022978024522>
3. "Valuing Environmental Degradation and Costing Remediation: Is Economics Part of the Problem?" (With Ian Burton) *Journal of Environmental Monitoring and Assessment*, volume 86, issue 1-2, July 2003, pp 47-61. The paper critiques neoclassical and ecological economics for relying entirely on monetary valuation (e.g., utility maximization in dollars). It argues that reducing complex environmental degradation to a single financial metric trivializes climate change and renders economic policy structurally unstable.
<https://doi.org/10.1023/A:1024050501094>
4. "Valuing Biodiversity: Reality or Mirage?" (with David Webb). *Journal of Environmental Monitoring and Assessment*, volume 86, issue 1-2, July 2003, pp 91-104. The objective of this paper was to consider the social value of biological diversity and explore if this value could be expressed in terms of a unidimensional metric in money. Economics distinguishes between use-values and non-use-values, which are critically evaluated for valuing biodiversity. It is shown that these utility-based valuations have severe limitations as they treat species in isolation from their ecological contexts. In contrast, ecosystem ecology regards ecosystems as an integrated non-linear and nonconvex system in which ecosystem functions can be understood as a four-component cycle; exploitation, accumulation of biomass, creative destruction and renewal. Within such a cycle, ecosystems can be seen to have two properties: stability and resilience. A good proxy for resilience is the probability of extinction of species, and social value of biodiversity can be expressed as a partial ordering with this probability as an index. <https://doi.org/10.1023/A:1024006718841>
5. "Global Change Land Use Policy on Marginal Lands: The Case of Northern Saskatchewan" (with Suren Kulshreshtha and Mark Johnston), *Geographical & Environmental Modelling*. Vol. 5, No. 2, 2001, pp 159-175. The paper

suggests that reforestation of marginal agricultural lands in Northern Saskatchewan is socially desirable, particularly when the role of the forests in mitigating global warming is considered.
<https://doi.org/10.1080/13615930120086069>

6. "Integrated Forest Management: Obstacles to a Comprehensive Integration of Economic and Environmental Dimensions," (with S. Kulshreshtha), *Journal of Sustainable Forestry*, Vol. 12, No. 1/ 2, 2001. Pp. 7-36. A foundational paper exploring the difficulty of balancing ecological sustainability with economic profitability in forestry. https://doi.org/10.1300/J091v12n01_02
7. "A Consistent Methodology for Estimating the Economic Costs of Natural Disasters: With the 1998 Ice Storm as a Case Study," (with David Etkin), 2000. Institute Environmental Studies, University of Toronto Press. The paper addresses the complexities of accurately measuring both the direct and indirect costs of natural disasters.
8. "The Importance of Measuring the Social Costs of Natural Disasters at a time of Climate Change," (with David Etkin), *Australian Journal of Emergency Management*, Spring 2000, Vol. 15, No. 3, pp 46-48. The policy implications of this paper are critical. Extreme climate events are natural disasters, which cause damage to capital and infrastructure. A sensible adaptation policy requires preparing to make the capital stock and infrastructure resilient to such extreme events; however, resilience will require investment and new regulations such as new or improved building codes.
<https://search.informit.org/doi/10.3316/informit.369789354803402>
9. "The Carbon Cycle and the Value of Canadian Forests," (with Mark Johnston) *Journal of Sustainable Forestry*, Vol. 12, No. 1 /2, 2000. Pp. 123-151. The seminal paper develops an economic equation for the value of forests using a dynamic optimization framework. It establishes the marginal social opportunity cost of forests by integrating the global environmental services of **carbon sequestration** with commercial forestry.
[valueshttps://doi.org/10.1300/J091v12n01_07](https://doi.org/10.1300/J091v12n01_07)
10. "Rawlsian Justice Theory and the developing Countries", *Asia Law Review*, 1999, The International Jurists Organization, pp. 4-23. (ISSN 0972-0421). The paper evaluates applying John Rawls's "Difference Principle" to international inequalities and resource distribution. The paper argues that limited resources in developing nations necessitate modifications to Rawlsian theory when applied on a global scale.
11. "A libertarian theory of rights and future generations," *Forum for Social Economics*, Vol. 27, No. 2, 1998, pp 23-35. The paper argues that

environmental degradation violates the libertarian rights of future generations.
<https://doi.org/10.1007/BF02802867>

12. "Deforestation and Global Market Pressures," (with Mark Johnston & Harvey Stevens), *Canadian Journal of Development Studies*. Vol. XVIII, no. 3, 1997 pp. 419-438. The paper shows that tropical deforestation is driven by global market pressures and circular causation rather than just domestic factors. The study critiques linear models and highlights the structural economic links between the North and South.
<https://doi.org/10.1080/02255189.1997.10721204>
13. "An Ecological-Economic Analysis of the Role of Canadian Forests in Mitigating Global Climate Change", (with Mark Johnston & Harvey Stevens) *Journal of Sustainable Forestry*, Vol. 5, No. 1/2, 1997, pp. 205-212. The paper evaluates the monetary and environmental value of Canada's forests in absorbing atmospheric CO₂. The paper assesses both the commercial and ecological services of the boreal and temperate forests. It analyzes their critical function as carbon sinks to offset global warming and introduces methodologies for the economic valuation of this environmental service.
https://doi.org/10.1300/J091v05n01_01
14. "The Problem of Valuation in Neoclassical Environmental Economics," *Environmental Ethics*, Spring 1996, Vol. 18, pp. 65-71. The paper advocates for a return to classical value theory, which grounds environmental valuation in real sacrifices and opportunity costs.
<https://doi.org/10.5840/enviroethics199618143>
15. "The Amazon Rainforest, Sustainable Development and the Biodiversity Convention" (with J. Nogueira), *Ambio: the Journal of the Human Environment*, Vol. 23, No. 8, December 1994, pp. 491-496. The paper analyzes the multiple causes of deforestation in the Amazon region and offers a critique of the 1992 Convention on Biological Diversity, which tends to focus on global conservation without sufficiently addressing the macroeconomic structural adjustments, debt, or poverty facing developing Amazonian nations like Brazil. <http://www.jstor.org/stable/4314266>
16. "On the Taxation of Resources Under Monopolistic Competition," *Atlantic Economic Journal*, Vol. 20, No. 2, 1992, pp. 11-20. This paper shows mathematically that a sales tax is the best tax to apply to the production of natural resources under monopolistic competition, because it encourages the corporation to mine all resources and not just the high grade resource.
<https://doi.org/10.1007/BF02298872>

17. "Entitlements, Missing Markets and Environmental Policy," (with A. Ward)
Journal Economics and Environmental Management, Vol. 20, No. 3, March 1991, pp.290-296. Through three simple economic models, the authors identify and analyze the core of environmental policy problems: the issue of economic motivation and incentives, the issue of legal liability for damage, and divergence between private and social costs of production.
[https://doi.org/10.1016/0095-0696\(91\)90015-B](https://doi.org/10.1016/0095-0696(91)90015-B)
18. "Mineral Taxation in Jamaica: An Oligopoly Confronts Taxes on Resource Rents — and Prevails," *American Journal Economics and Sociology*, Vol.46, No. 2, April 1987, pp.180-204. The paper explores the allocative effects on bauxite production in Jamaica following the imposition of an ad valorem tax in 1974, concluding that the consequences of the tax have been disastrous and that the ad valorem tax on the recovered ore must be replaced by some form of a profits-based tax. <https://doi.org/10.1111/j.1536-7150.1987.tb01954.x>
19. "A Note on the Taxation of Resources under Oligopoly," (with G.C. Harcourt), *Economics Letters*, Vol.21, no.1, 1986, pp.81-84. The paper is a significant scientific contribution to the field of natural resource economics and taxation of exhaustible resources. [https://doi.org/10.1016/0165-1765\(86\)90127-8](https://doi.org/10.1016/0165-1765(86)90127-8)
20. "Market Structure and the Taxation of Exhaustible Resources in Developing Countries," *American Journal of Economics and Sociology*, Vol. 49, No.4, October 1990, pp. 459-468. The paper contrasts traditional static and Hotelling-based dynamic tax theories with models of imperfect competition. <https://doi.org/10.1111/j.1536-7150.1990.tb02472.x>
21. "The Optimal Depletion of a Theory of Exhaustible Resources: a Comment", *Journal of Post-Keynesian Economics*, Vol. X, No. 4, 1988, pp.646-650. The paper is a notable academic critique in the field of resource economics, evaluating established mathematical models of exhaustible resources—specifically building upon the neoclassical foundations of the Dasgupta-Heal-Solow-Stiglitz (DHSS) model and Hotelling's rule.
<https://doi.org/10.1080/01603477.1988.11489715>

TOPIC 2B: THREE BOOKS ON ENVIRONMENTAL POLICY

1. *Climate Change and Forest Management in The Western Hemisphere: Selected Case Studies* (edited book), New York: Haworth Press, 2001. The book offers a comprehensive overview of a vital subject. It is an essential resource for forestry specialists, environmental economists, and anyone interested in climate change or sustainable agriculture. It was also published concurrently as a special double issue of the *Journal of Sustainable Forestry*.

2. *Sustainable Forest Management and Global Climate Change*, (edited with Rubén Guevara) Aldershot, U.K.: Edward Elgar, 2000. The book discusses the role that forests play in reducing global warming, in preventing soil erosion and in helping to minimise the loss of biodiversity. It is an in depth and fascinating discussion as well as a policy guide for the sustainable management of forests for academics and policy groups working across environmental economics, including global climate change and sustainable development.
3. *Global Environmental Economics: Equity and the Limits to Markets*, (edited with Tim Mount), Cambridge, Mass: Basil Blackwell, 1999. The book represents a collaboration by economists, ethicists, political scientists, demographers, and ecologists from around the world, illustrating that the issues of equity can be applied to global environmental problems as well as take a more central role in economic theory. It contends that new developments in social-choice theory offer a better foundation than traditional welfare economics. The book represents a significant international and multidisciplinary contribution to ecological economics. In contrast to standard economic approaches that focus on short-term market solutions, this work focuses on market limitations, equity, and social choice theory. The chapters are foundational to debates surrounding "missing markets" and environmental degradation. They are heavily cited in environmental ethics and ecological economics literature (e.g., *Mitigation and Adaptation Strategies for Global Change*). The book challenges neoclassical economics by addressing how intertemporal externalities and market failures impact future generations.
Book reviews of *Global Environmental Economics*:

"After reconnecting neo-classical economic theory to moral philosophy, these essays systematically describe the real challenges of global environmental economics and politics in a world of future uncertainties. Putting equity - intranational, transnational and intergenerational - at the centre of analyses does not make the answers easier, but it does make their pursuit realistic and potential application more effective."

(Richard B. Norgaard, Professor of Energy and Resources and of Agricultural and Resource Economics, University of California, Berkeley)

"This volume makes a valuable contribution to the literature by providing a unified theoretical background to the topic in addition to specific representative applications. The presentation of both vertical and horizontal equity is unique in that this volume pulls together ideas that lead to the recognition that one form of equity cannot generally be addressed in isolation from the other. The over-riding strength is the direct approach taken to a complex and controversial issue. The argument that equity is, and should be, a determining factor in how we

address global environmental issues is clearly expressed and well-supported on both theoretical and applied bases."

(Jane V. Hall, Professor of Economics, California State University, Fullerton)

POLICY ACTION: We proposed the global adoption of a "Forestry Convention" to parallel the UN Framework Convention on Climate Change," at about the same time when the Kyoto Protocol was proposed and was ratified by 192 countries. (The USA signed the Protocol but did not ratify it. Canada signed it but withdrew from it in 2011.) Our proposal for a Forestry Convention did not receive any formal support by any government, partly because sustainable forestry practice infringed on political sovereignty.

TOPIC 3: WATER RESOURCES AND THE ENVIRONMENT

TOPIC 3A: REFEREED ARTICLES ON WATER POLICY

1. "Projecting financial capability in small Canadian drinking water treatment systems." (With Janzen, Aaron, Gopal Achari, and Cooper H. Langford.) *Journal-American Water Works Association* 109, no. 10 (2017): E440-E451. The paper explores the economic viability and financial capacity of small water treatment plants in Canada. The authors emphasize that shifting the entire financial burden to small municipalities (local taxes) directly threatens public health and leads to frequent restrictions and obligations to boil water (boil water advisories). They suggest that Canada's federal and provincial levels of government should more aggressively subsidize these systems, citing the constitutional right that all citizens, regardless of where they live, are entitled to comparable public services. <https://doi.org/10.5942/jawwa.2017.109.0113>
2. "Performance Management of Small Water Treatment Plant Operations: A Decision Support System" (with Gopal Achari, Stein, Haider, Sadiq, & Langford), *Water and Environment Journal*, 2017, 31 (3), pp.330-344. The paper discusses the development of a decision support system (DSS) with the aim of optimizing the performance and daily management of small drinking water treatment plants. Small water supply systems often have limited resources and a lack of skilled personnel, which is why such a tool is crucial to prevent operational work that can endanger human health. <https://doi.org/10.1111/wej.12248>
3. "Cost recovery and affordability in small drinking water treatment plants in Alberta, Canada." with Janzen, Aaron, Gopal Achari, and Cooper H. Langford." *Journal-American Water Works Association* 108, no. 5 (2016): E290-E298. The paper warns that small drinking water treatment plants in

Alberta, Canada, face significant economic challenges, with only one of 25 surveyed communities achieving full cost recovery. High operational costs and affordability issues require solutions such as regionalization, water charges revisions, or alternative treatment technologies to ensure sustainability. <https://doi.org/10.5942/jawwa.2016.108.0047>

4. “Cost differentials and scale for newer water treatment technologies” (with RG Singh, Arian Khaleghi-Moghadam and G. Achari), *International Journal of Water Resources and Environmental Engineering*. Vol. 5(2), pp. 100-109, February 2013. This paper analyzes the unit costs and economies of scale for five advanced water treatment technologies compared to conventional chlorination. <https://doi.org/10.5897/IJWREE12.103>
5. “Cost Scenarios for Small Drinking Water Treatment Technologies” (with Rajiv Singh, Gopal Achari, & Arian Khaleghi-Moghadam), *Desalination and Water Treatment*, 2013, Vol. 51, Issue 16-18, pp. 3628-3638. The paper deals with economic analysis and cost modeling for water supply systems in smaller communities. <https://doi.org/10.1080/19443994.2012.751148>
6. “An integrated performance assessment framework for water treatment plants” (with Kejiang Zhang; Gopal Achari; Rehan Sadiq; and Cooper H. Langford) in *Water Research* Volume 46, Issue 6, 15 April 2012, pp. 1673–1683. The paper introduces a methodology combining reliability, robustness, and quantitative microbial risk assessment (QMRA) to evaluate water treatment plant efficiency. The framework utilizes multi-barrier concepts to assess the performance of coagulation, sedimentation, filtration, and disinfection process. (58 Citations, PlumX Metrics). <https://doi.org/10.1016/j.watres.2011.12.006>
7. “Bulk Water Exports, Diversions and Water Conservation: Some Policy Issues for Canada” (with T. Heinmiller) *Policy Options*, Vol. 30, Issue # 1, December 2008-January 2009, pp 83-88. The article addresses the tension between calls to export Canada's freshwater to drought-stricken regions (like the US Southwest) and the need for rigorous domestic water conservation.
8. “A tale of Two Waters: the Missouri River, the Great Lakes and management of future water conflicts” (with David Whorley). *Water International*. Volume 31, Number 4, pp. 488-498, December 2006. The paper addresses how shifting management practices on the Missouri River could threaten water levels in the Mississippi River. The authors propose strict watershed management practices to ensure that Great Lakes water remains within its natural basin, highlighting the importance of preventative policies by Great Lakes states and provinces. <https://doi.org/10.1080/02508060608691952>

7. "Exporting fresh water: is there an economic rationale?" *Water Policy* (a journal of the World Water Council), Vol. 7. 2005, pp. 313-327. The paper evaluates the viability of bulk water exports compared to local desalination and concludes that bulk marine exports are only economically viable under strict, short-distance conditions. <https://doi.org/10.2166/wp.2005.0020>
8. "Privatization of water in the UK and France-What can we learn?" *Utilities Policy*, Volume 12, 2004, pp. 41-50 (With Joseph Kushner and Klemen Zumer). The paper analyzes water privatization in the UK and France, concluding that the choice between public and private management must rest on the theory of optimal taxation and absolute efficiency. (63 Citation Indexes, [7 Policy Citations by Korea Research Institute for Human Settlements](#), PlumX Metrix) doi:10.1016/j.jup.2003.11.002
9. "Forecasting the Economic Costs of Desalination Technology," *Desalination*, Volume/Issue 172/3, 2005 pp. 207-214. The paper evaluates the economic viability and cost trends of desalination water. It explores how technological advancements impact unit water costs and presents forecasts to determine when reverse osmosis becomes competitive with conventional treatment. (76 Citations, PlumX Metrix) doi:10.1016/j.desal.2004.07.036

TOPIC 3B: TWO BOOKS ON WATER MANAGEMENT & POLICY

1. *Global Drinking Water Management and Conservation*, Springer International, 2015, ISBN 978-3-319-11031-8. Source-water protection, water treatment technology, and the water distribution network are critically reviewed and discussed. The book suggests improvements for the management of risks and financial viability of the treatment infrastructure, as well as ways toward an optimal management of the distribution network through the risk-based management of all infrastructure assets. (35 Citation Indexes, [1 Policy Citation](#) by the Inter-Academy Partnership, Dimensions) DOI 10.1007/978-3-319-11032-5
2. *Water Policy in Canada: problems and possible solutions*, Springer international, 2015, ISBN 978-3-319-15882-2. The book critically discusses the water policy and management in different Canadian provinces, warns about threats and risks to the drinking water supply from human activities, and contrasts water policy and practice in Canada with the practice in some

European countries. Forward written by Robert Sandford, who calls it “a blueprint worth following.” (15 citations, Dimensions) DOI 10.1007/978-3-319

POLICY ACTION & IMPACT:

My most important recommendation was to Health Canada in 2013. Water is a provincial responsibility; therefore, Health Canada had to accept a flawed lead sampling protocol used in Ontario that underestimated lead in drinking water samples. But based on statistical analysis, I argued that if they must accept flawed sampling, the Maximum Allowed Contamination (MAC) should be lowered to 5 mcg/L. In 2019, in the new Guidelines, Health Canada lowered the MAC to 5 mcg/L.

My other policy successes were with water utilities. Municipality of Greater Victoria accepted my climate adaptation recommendations and expanded the Sooke Reservoir. Further expansion of the Reservoir is scheduled in 2026. In June 2026, Greater Vancouver is in Stage 3 water restrictions, but Victoria only has the usual summer Stage 1 restrictions which apply every year (May-Sept), and that involves lawn watering on two days a week. Niagara Region also accepted advice on the separation of combined storm and sewer drainage. In Alberta, we had direct access to more than 10 small water utilities, including some that accepted and adopted “trickle fill” solutions, namely using small diameter connection to large water systems but receiving water at off-peak times only, when water demand in the larger city is low.

RESEARCH TOPIC 3C CHAPTERS IN BOOKS ON CLIMATE CHANGE AND WATER RESOURCES

1. “Projecting future climate scenarios to 2100 using general circulation models: a global synthesis,” (with Peter Simcisko). In *Climate Change and Water Resources*. Edited by Dr Tamim Younos, Series: Handbook of Environmental Chemistry, Springer Berlin, 2013. The chapter provides critical insights into how Canada's climate will change through the end of the 21st century. Due to its geographic location, Canada's land mass is warming approximately twice as fast as the global average, while the Arctic is warming up to three times faster. Data obtained from these models are integrated into national platforms such as ClimateData.ca and **PCIC** (Pacific Climate Impacts Consortium) to design infrastructure that is resistant to floods and extreme temperatures, to advance water resource management planning in the hydropower sector, and to adapt agriculture to new agro-climatic zones moving north due to climate change. https://doi.org/10.1007/698_2013_220

2. "Projected Future Precipitation Scenarios for a Small Island State: The Case of Mauritius," (with Rajiv Singh). In *Climate Change and Water Resources*. Edited by Dr Tamim Younos, Series: Handbook of Environmental Chemistry, Springer Berlin, 2013. The chapter explores the impact of climate change on the rainfall regime of small island states, using Mauritius as a case study. The results show that historically wet months will become even wetter, while dry months will become even drier, threatening groundwater and drinking water supplies, which will put a lot of pressure on the local population and the fast-growing tourism industry on the island.
3. "The Economic Value of Life," in Peter Bobrovsky (ed), 2013, *The Encyclopaedia of Natural Disasters*, Springer, ISBN 978-90-481-8699-0. (published May 27, 2013). This chapter was published in the major scientific publication *Encyclopedia of Natural Hazards*. The chapter discusses the economic value of human life in the context of natural disasters. It is a key resource for decision-making and [cost-benefit analysis](#) when investing in security infrastructure. https://doi.org/10.1007/978-1-4020-4399-4_173
4. "The Economic Consequences of Disasters due to Asteroid and Comet Impacts, Small and Large", in Peter Bobrowsky and Hans Rickman (Editors) 2005, *Comet/Asteroid Impacts and Human Society*, Springer Verlag Publishing. My chapter analyzes how near-Earth object (NEO) impacts of various sizes affect the local, regional and global economy, with reference to the disparity between the threat and the capacity of financial systems. My chapter urges policymakers to develop resilient financial systems and societal recovery plans that go beyond standard models for common natural disasters. https://doi.org/10.1007/978-3-540-32711-0_29
5. "Natural Disasters, Adaptive Capacity and Development in the 21st Century," (with David Etkin) in Mark Pelling (editor), *Natural Disaster and Development in a Globalising World*, London, UK: Routledge. Chapter 5, pp75-92. ISBN 0-415-27957-7 (hardcover); ISBN 0-415-27958-5 (paperback) The chapter analyzes how economic growth and globalization affect a society's capability to manage environmental risks. The chapter argues that disasters are socially constructed through vulnerability rather than just natural events, introducing the concept of socio-economic "triage" in risk management. The chapter is published in the first book that acknowledges the full implications of globalization for disaster and development.
6. "The Carbon Cycle and the Value of Forests as a Carbon Sink: a Boreal Case Study," with Mark Johnston in *Sustainable Forest Management and Global Climate Change*, (edited with Rubén Guevara) Aldershot, U.K.: Edward Elgar, 2000. The chapter evaluates the boreal forest biome, emphasizing its crucial biophysical role in both the carbon cycle and as a long-term carbon sink. The

book assesses how forest conservation aligns with international climate agreements, particularly exploring the flexible mechanisms (such as the Clean Development Mechanism) introduced by the Kyoto Protocol.

7. "Land Use Policy and Global Warming: A Case Study of the Boreal Forest Region of Saskatchewan," with Suren Kulshreshtha and Mark Johnston, in *Sustainable Forest Management and Global Climate Change*, (edited by Dore and Rubén Guevara), Aldershot, U.K.: Edward Elgar, 2000. This chapter examines the critical intersection of climate change and land-use policies in Saskatchewan's boreal forests. It analyzes how sustainable forest management practices and carbon sequestration strategies can mitigate global warming. The case study provides a localized perspective on how boreal ecosystems—which store massive amounts of carbon—interact with regional land policies, agriculture transitions, and climate-induced warming. <https://doi.org/10.4337/9781840641615.00001>
8. "Integrated Forest Management: Obstacles to a Comprehensive Integration of Economic and Environmental Dimensions," in *Climate Change and Forest Management in the Western Hemisphere: Selected Case Studies* (edited by Mohammed Dore), New York: Haworth Press, 2001. The chapter explores why applying an integrated approach to forests is so difficult. To overcome these barriers, the authors point to two main pathways, including stakeholder participation and utilization of multiple-criteria decision-making frameworks to weigh economic demands against vital environmental services.
9. "The Carbon Cycle and the Value of Canadian Forests," in *Climate Change and Forest Management in the Western Hemisphere: Selected Case Studies*, (edited by Mohammed Dore), New York: Haworth Press, 2001. The chapter explores how Canadian forests act as crucial ecological sinks that sequester carbon to mitigate global warming. It outlines the total economic value of this carbon storage and discusses sustainable forest management strategies that prioritize climate regulation over traditional timber yields.
10. "The Economics of Well-Being: a Review of Post Welfarist Economics." In Dore and Mount (eds.) *Global Environmental Economics*, Cambridge, Mass: Basil Blackwell, 1999. pp. 21-38. The chapter lays the groundwork for linking macroeconomic models to planetary boundaries and sustainable development, focusing on sustainability and alternative measures of well-being, rather than traditional neoclassical welfare approaches.
11. "Epilogue," in *Global Environmental Economics*, Cambridge, Mass: Basil Blackwell, 1999. pp. 333-337. The chapter presents proposals for building an equity-focused global economic framework that would protect planetary resources.

12. "Deforestation in developing countries and pressures from global markets," In *Sustainable Development and Global Markets*, edited by Dev Gupta and Nanda Choudrey. Boston, MA: Kluwer Academic Publishers, 1997, pp 259-272. The chapter argues that policies that alleviate poverty in the South will also help reduce all forms of environmental degradation, including tropical deforestation. https://doi.org/10.1007/978-1-4615-6203-0_13

RESEARCH TOPIC 4: ECONOMICS, FINANCE & STATISTICAL ANALYSIS

TOPIC 4A: REFEREED ARTICLES

1. "Informational asymmetries in US private equity: regulation in changing regulatory environment," (with Ernest N. Biktimirov). *Journal of Financial Regulation and Compliance*. June 2025. 1358-1988. This paper highlights the systemic risks associated with private equity and the regulatory challenges in addressing them. It advocates for balanced reforms that maintain private equity's role in economic growth while ensuring transparency, stakeholder protection and financial stability. <https://doi.org/10.1108/JFRC-03-2025-0070>
2. "Nonparametric correlation integral–based tests for linear and nonlinear stochastic processes," (with Mariano Matilla-García, Manuel Ruiz Marín, Rina B. Ojeda) *Decisions in Economics and Finance*, (2014), 37 (1), pp. 181-193. The paper proposes a new aggregate test for independence, based on Brock, Dechert, and Scheinkman (BDS) test outputs from a given data set, that allows the consideration of all the information contained in several embedding dimensions without the ambiguity of the well-known BDS tests. <https://doi.org/10.1007/s10203-013-0143-0>
3. "A permutation entropy-based test for causality: The volume-stock price relation," (with Mariano Matilla, Manuel Ruiz). *PHYSICA A*, (2014), 398, pp. 280-288. This paper introduces a non-parametric, permutation entropy-based test for linear and nonlinear causality. It evaluates how trading volume and security prices interact and explores the complex volume-stock price relationship. (30 Citations, PlumX Metrics) <https://doi.org/10.1016/j.physa.2013.11.031>
4. "Nonparametric Tests for Serial Dependence Based on Runs," *Nonlinear Dynamics Psychology and Life Sciences*, (2014) (with Manuel Ruiz, Úrsula Faura, Matilde Lafuente), 18(2), pp. 123-136. The paper deals with the development and analysis of statistical methods in the field of time series, including applicability, power evaluation, and comparison. <https://www.societyforchaostheory.org/ndpls/askFILE/?docObjId=180201ABSTR>

5. "Nonparametric correlation integral–based tests for linear and nonlinear stochastic processes," (with M. Matilla, M. Ruiz Marin & R.B. Ojeda. *Decisions in Economics and Finance*, 2014, 37 (1), pp. 181-193. The paper introduces a methodology that addresses the arbitrary choice of embedding dimension (m) and proximity parameters ($\mathcal{E}$) in correlation integral-based tests, such as the BDS test. It proposes a multi-distance approach that evaluates the entire distribution of distances simultaneously, eliminating the need to select a single optimal value. <https://doi.org/10.1007/s10203-013-0143-0>
6. "The Global Financial Crisis and the Great Recession of 2007-09," (with Rajiv G. Singh) in *Nonlinear Dynamics, Psychology and the Life Sciences*, 2010, Vol. 14, No. 3, pp. 317-342. This paper presents a detailed re-examination of the global financial crisis and the worst recession to hit the world economy since the Great Depression of the 1930s. The work directly builds on the previous research of the same authors from 2009, significantly expanding its scope and theoretical framework. The global implications of the economic crisis for other countries are analyzed and final conclusions about systemic instability are drawn.
7. "The Impact of Edward Lorenz: An Introductory Overview," *Nonlinear Dynamics, Psychology and the Life Sciences*. July 2009, Vol 13, Number 3, pp 243- 247. The overview provides a foundational introduction honoring Edward Lorenz, the mathematician and meteorologist who founded chaos theory. It sets the stage for several of Lorenz's profound, cross-disciplinary impacts, including the butterfly effect, complexity in life sciences, and limits of predictability.
8. "Turning Points in Nonlinear Business Cycle Theories, Financial Crisis and The Global 2007-2008 Downturn," (with Rajiv G. Singh) *Nonlinear Dynamics, Psychology and the Life Sciences*. October 2009, vol.13, Number 4. pp.423-444. The paper examines how unequal income distribution and the deregulation of financial markets led to the 2007–2008 global financial downturn. It argues that only the Goodwin model—a cyclical growth model based on the interaction between employment rates and the wage share—successfully reflects the stylized facts of observed business cycles and provides a plausible mechanism for turning points.
9. "Do Nonlinear Dynamics in Economics Amount to a Kuhnian Paradigm Shift?" (with Barkley Rosser, Jr.), in *Nonlinear Dynamics, Psychology and the Life Sciences*, January 2007, Vol.11, No. 1, pp. 119-147. In this article, we argue that empirical work has largely transcended static neoclassical models in economics, highlighting the theoretical conflict between complexity theory and orthodox general equilibrium commitments.

10. "Discreteness or Convexity of the State Space: Implications for Nonlinear Economics," *Nonlinear Dynamics, Psychology and Life Sciences*, Vol. 9, No. 2, April 2005: pp. 209-227. The paper challenges the neoclassical assumption that economic state spaces are convex and continuous. It demonstrates that discrete state spaces are more realistic and inevitably produce complex, chaotic, and non-convergent dynamics.

11. "Professor Johnson on Social Choice: A Review Article," *Contemporary Psychology*, Volume 45, No. 5, October 2000, Pp. 518- 522. This paper reviews Paul E. Johnson's *Social Choice: Theory and Research*, focusing on the text's reliance on majority decision making. While commending the exposition of convex analysis, the review criticizes the book for limiting its scope and failing to explore the implications of continuous modeling.

12. "Keynes's casino capitalism, Bagehot's international currency, and the Tobin Tax: historical notes on preventing currency fires," (with Robert Dimand), *Journal of Post Keynesian Economics*. 2000, Vol 22, No. 4, Summer, pp 515-528. This paper focuses on stabilizing financial markets and preventing speculative attacks on currencies. The authors explain how a transaction tax (like the Tobin tax) can reduce volatility in international currency markets.
<http://www.jstor.org/stable/4538698>

13. "Cournot, Bertrand and game theory: a further note," (with Robert Dimand), in the *Atlantic Economic Journal*, 1999, 27 (3), 325-333. This paper represents a contribution to the history of economic thought and game theory by re-examining and demystifying the traditional interpretation of the historical conflict between Antoine Augustin Cournot and Joseph Bertrand.
<https://doi.org/10.1007/BF02299582>

14. "On playing fair: Professor Binmore on game theory and the social contract," *Theory and Decision*, Vol.43, Issue no.3 (1997), pp.219-239. The paper provides a detailed critique of Ken Binmore's game-theoretic approach to social contract theory, questioning whether complex human morality can be fully reduced to evolutionary game theory.
<https://doi.org/10.1023/A:1004948310616>

15. "Walrasian General Equilibrium and Nonlinear Dynamics," *Nonlinear Dynamics Psychology and the Life Sciences*, Vol. 2, No 1, 1998, pp. 59-72. The paper critiques neoclassical microeconomics, particularly the Sonnenschein-Mantel-Debreu (SMD) theorem, highlighting that aggregate excess demand curves can take virtually any shape. <https://doi.org/10.1023/A:1022376227721>

16. "Dynamic Games in Macro Models: a Critical Appraisal," *Journal of Post-Keynesian Economics*, Vol. 18, No. 1, Fall 1995, pp. 107- 123. The paper discusses the question of how economic policymakers (e.g. governments) revise their strategies over time and why "optimal" plans often become unsustainable in a dynamic environment. The need for more realistic modeling of economic instabilities, conflicts of interest, and the distribution of power within the economy is emphasized.
<https://doi.org/10.1080/01603477.1995.11490061>

17. "Growth Theory Without the Steady State," *Science and Society*, Vol. 59, No. 1, Spring 1995, pp. 87-94. The paper critiques neoclassical and endogenous growth models for over-relying on equilibrium paths. The paper argues that actual economic development is characterized by structural changes and disequilibrium, rather than smooth convergence to a steady state.
<https://www.jstor.org/stable/40403468>

18. "The Optimal Length of a Patent with Variable Output Elasticity and Returns to scale in R&D," (with J. Kushner and I Masse), *Atlantic Economic Journal*, Vol. 21, No. 1, March 1993, pp. 10-26. This paper argues that previous economic frameworks relying on a "constant elasticity" assumption frequently overestimate how long a patent needs to last to protect an innovator.
<https://doi.org/10.1007/BF02299772>

19. "The LDC Debt and the Commercial Banks: a Proposed Solution," (with Lorie Tarshis), *Journal of Post-Keynesian Economics*, Vol. 12, No. 3, Spring 1990, pp.452-465. The paper examines the 1980s sovereign debt crisis and proposes an institutional mechanism for LDC (Less Developed Country) debt relief. <https://www.jstor.org/stable/4538202>

20. "The Use of Mathematics in Social Explanation," *Science and Society*, Winter, Vo.52, No. 4, 1988-89, pp.456-469. The paper critically examines the limitations of applying strict mathematical models to complex social and historical phenomena, advocating for analysis that prioritizes institutional context and historical materialism.
<https://doi.org/10.1177/003682378805200404>

21. "Income growth, debt and deficits: lessons from sub-Saharan Africa," *International Review of Applied Economics*, Volume 2, Issue 1, February 1988. pp. 23-41. The paper explores the link between agricultural progress and macroeconomic growth. It emphasizes that broad-based agricultural growth is an essential catalyst for overall economic development in sub-Saharan Africa, lowering food costs while boosting rural incomes and overall food security.
<https://doi.org/10.1080/758537846>

22. "The Millions of Equations Debate: Seventy Years after Barone," (with M. Kaser), *Atlantic Economic Journal*, Vol. XII, no.3, September 1984, pp. 30-44. The paper examines the historical continuity of the socialist calculation debate. It traces how mainstream computational and market-socialist economic theories evolved from Enrico Barone's 1908 framework. The paper looks at the computational and practical feasibility of gathering information and solving the millions of simultaneous equations required for resource allocation without market prices. The debate on socialist economic calculation is analyzed from the perspective of modern economic theory, the development of computer technologies, and the actual experience of centrally planned economies at the end of the 20th century. <https://doi.org/10.1007/BF02304575>
23. "The Concept of Equilibrium," *Journal of Post-Keynesian Economics*, Winter 1984-85, Vol. VII, no.2, pp. 193-206. The paper criticizes neoclassical static models and advocates a "shifting equilibrium" that incorporates uncertainty and historical time. The paper redefines equilibrium as a process subject to changes in expectations, emphasizing the stability of the system below the level of full employment. <https://doi.org/10.1080/01603477.1984.11489494>
24. "An Approach to Intertemporal Equilibrium with Production," *Atlantic Economic Journal*, Vol. VIII, no.4, December 1980, pp. 1 -9. The paper outlines how the introduction of the production structure and capital accumulation affects market and price stability, highlighting the conditions under which consumer savings decisions are perfectly aligned with the company's investment plans over a long period of time. <https://doi.org/10.1007/BF02300508>

TOPIC 4B: THREE BOOKS IN ECONOMICS

1. *The Macroeconomics of Business Cycles: a Comparative Evaluation*, NY: Basil Blackwell, 1993. Japanese translation published by *Bunka Shobou Hakubunsha*, Tokyo, 1995. This book is a comparative evaluation of the main theories of business cycles, offering critical insights to graduate and advanced undergraduate students in economics.
1. *John Von Neumann and Modern Economics* (Dore as Managing Editor; other editors: S Chakravarty and R. Goodwin), Oxford: Oxford University Press, 1989. The book explores the influence of the mathematician John von Neumann on economic science and commemorates the 50th anniversary of a major article in economics by John Von Neumann. It includes chapters by 3 Noble Laureates in Economics (Paul Samuelson, Kenneth Arrow & John Harsanyi).
2. *Dynamic Investment Planning*, London: Croom Helm, 1977. Re-issued as a classic by Routledge, 2014. *[Book based on my Oxford doctoral dissertation]* *By simplifying the mathematical notation, the book discusses control theory as*

a practical tool that can be applied to the problem of timing of investments.
<https://doi.org/10.4324/9781315733203>. The book was re-issued in 2014 by Routledge Publishers, as a “classic.”

TOPIC 4C: CHAPTERS IN BOOKS ON ECONOMICS

1. "Inflation," & "Post Keynesian business cycle theory," and "Stylized facts," in David Glasner, ed., *Business Cycles and Depressions: An Encyclopaedia*, New York: Garland, 1997, pp. 328-29, 538-40, 662-64.
<https://doi.org/10.4324/9780203056080>
2. “The Representative Agent Model,” in Brian Snowdon and Howard R. Vane (editors), *Encyclopaedia of Macroeconomics*, Cheltenham, UK: Edward Elgar, 2002. pp. 623-628. ISBN 1 84064 3870. Note: The Encyclopedia of Macroeconomics is an authoritative and invaluable reference source on macroeconomics, which embraces definitions of terms and concepts, conflicting ideological approaches and the contributions of major thinkers. Comprehensive in scope, it contains over 300 short entries and more than 100 specially commissioned main entries from an internationally renowned group of scholars.
3. “Equity”, in Jonathan Michie (ed.) *Reader's Guide to the Social Sciences*, London, UK: Fitzroy Dearborn Publishers. 2001. The Reader's Guide to the Social Sciences is a comprehensive critical guide to the literature of key social science disciplines, including economics, sociology, politics, and law. The chapter "Equity" offers students and researchers an analytical overview of the most important books, theories and academic works dealing with the concept of equity and the distribution of resources in society.
4. “On the Concept of Equilibrium,” in Donald A. Walker (ed.), *Equilibrium, Volume 1 Introduction to Equilibrium in Economics*, Aldershot, U.K.: Edward Elgar, 2000, pp 470-483. Reprinted from Journal of Post Keynesian Economics. Originally published in the Journal of Post Keynesian Economics in 1984, the chapter was reprinted in Donald A. Walker's 2000 collection, *Equilibrium, Volume 1*. The chapter analyzes the methodological foundations and constraints of economic equilibrium within the post-Keynesian tradition.
5. "The Impact of John Von Neumann's Method," in *Measurement, Quantification, and Economic Analysis: numeracy in economics*, edited by Ingrid Rima, London UK: Routledge, 1995, pp. 436- 452. The chapter highlights how John von Neumann’s 1937 model established a rigorous, axiomatic framework for economic theory, creating a direct correspondence between mathematical structures and production realities, warning against the

uncritical application of mathematical tools from the physical sciences to economic analysis.

6. "The Gorbachev Reforms and the Left Opposition of the 1920s," in *Perspectives on the History of Economic Thought*, Vol. VII, edited by S. Todd Lowry, Aldershot, U.K.: Edward Elgar, 1992. The chapter explores the economic parallels between Mikhail Gorbachev's late-1980s perestroika reforms and the economic debates within the Soviet Left Opposition of the 1920s, analyzing how Gorbachev's policies echoed the earlier opposition's push for democratization, market mechanisms, and industrial decentralization within a socialist framework.
7. "Tarshis on LDC Debt: comment ", in *The Future of the International Monetary System*", edited by O.F.Hamouda, R.Rowley, and B.M.Wolf, Aldershot, U.K.: Edward Elgar, 1989. The chapter is a commentary on the analyzes of the prominent Canadian Keynesian economist Lorie Tarshis regarding the debt crisis of developing countries, one of the central topics in macroeconomic discussions during the 1980s.
8. "The Legacy of John Von Neumann", in Dore *et al.*, *John Von Neumann and Modern Economics*, Oxford: Oxford University Press, 1989. This book marks the 50th anniversary of John Von Neumann's seminal 1937 article entitled "A Model of General Economic Equilibrium," which had a profound impact on modern economic theory. Includes chapters by 3 Nobel Laureates in Economics (Paul Samuelson, Kenneth Arrow and John Harsanyi). **Legacy of the book and Debate:** The essays evaluate von Neumann's contributions alongside classical economists and the earlier models of Keynes and Sraffa, offering a deep look into the mathematical rigor that sparked the mid-century formalist revolution in economics.
9. "A Game Theoretic Growth Model", in Dore *et al.* (eds.), *John Von Neumann and Modern Economics*, Oxford University Press, 1987. The chapter analyzes and mathematically extends the famous von Neumann growth model
10. "Optimal Resource Allocation as a Differential Game," in Liu and Sutinen (eds.), *Dynamic Optimization and Mathematical Economics*, New York: Marcel Dekker, 1979. The chapter addresses dynamic resource allocation in multi-product firms using differential games, specifically employing Leontief technology to model production, advancing economic theory.

TOPIC 5: MAJOR EXTERNALLY FUNDED RESEARCH GRANTS

1 NSERC: Strategic Network Initiative PI: Mohseni, UBC & Dore as co-applicant	Res'eau-Waternet: Enhancement Initiatives activities, including knowledge; First Nations water.	\$162,000	March 2012
2. SSHRC IOF Dore as PI	The use of symbolic dynamics. In social science data: [IOF is the " <i>International Opportunities Fund</i> " of SSHRC]	\$74,964	April 2010-2012
3. NSERC PI: Mohseni Dore as Theme Leader & Co-applicant	Res'eau-Waternet: An NSERC Strategic Network Grant; total grant \$5.25 million over 5 years. My projects share over 5 years	\$174,000	Oct. 2008-2013
4 Canadian Foundation for Climate and Atmospheric Sciences (CFCAS) <i>Dore as PI & applicant</i>	Extreme Events in Western Canada	\$130,000	July 18, 2008-2011
5. SSHRC Dore as PI	Modernizing Drinking Water Supply in Small and Rural Communities: Sustainability and Risk	\$171,499	April 2, 2009-2013
6 CWN (PI: M. Prévost) Dore as Co-applicant	Cost of meeting new Canada Wide Standards for Lead in drinking water	\$48,000	May 2007-11
7. Canadian Water Network: Dore as co-applicant	Workshop for Reseau grant proposal	\$12,000	Jan. 2008
8. Canadian Water Network,	Climate Change and Impacts on Water (P4011)	\$204,000	2007

Dore as co-applicant			
9. Canadian Water Network, Dore as Co-applicant	Advanced Water Supply (P4018)	\$40,000	2005
10. Canadian Water Network. Dore as co-applicant	Integrity of water Distribution Systems (P4037)	\$17,900	2004
11. Canadian Water Network Dore as co-applicant	Program Leader grant	\$25,000	2002
12. Natural Resources Canada Dore as PI	Cost of landslides in Canada	\$22,000	2002
13. Canadian Water Network Dore as co-applicant	Program Leader grant: Infrastructure Theme	\$15,000	2001
14. Network Centres for Excellence (2001). Funded by NSERC, SSHRC and CIHR. with Mohammed Dore as one of Six Theme leaders of CWN.	<i>Canadian Water Network (CWN-RCE)</i> , awarded 2001. Total awarded: \$14.9 million	\$14.9 million	2001-2004
15. Canadian Water Network, Dore as PI	<i>Water Infrastructure</i>	\$672,000	2001
16. Canadian Water Network Dore as PI	<i>Case studies in climate change impacts on water</i>	\$235,320	2001
17. Natural Resources Canada, Impacts & Adaptation Dore as PI	<i>The value of water infrastructure data</i>	\$24,000	June 2001-April 2002

million			
22. National Science Foundation (USA). with Dore as Principal Investigator	<i>Human Dimensions of Global Change and Sustainable Forest Management (Inter American Global Change Program)</i>	US \$50,000	1996-1997
23. Social Sciences and Humanities Research Council of Canada Dore as PI	<i>Sustainable Use of Forests</i>	\$32,000	1994-1997
24. Social Sciences and Humanities Research Council Dore as PI	Strategic grant: Environmental ethics and justice for future generations	\$50,400	1991-1993
25. Social Sciences and Humanities Research Council Dore as PI	<i>Standard grant: Resource allocation mechanisms</i>	\$9,000	1981-1985

OTHER EXTERNAL RESEARCH GRANTS

Amounts

Year 2000

1. *Federal and Provincial Parks Council (Ottawa)*
TOPIC: Carbon Sequestration in Protected Areas \$14, 900
2. *Canadian Research Forum (Ottawa)*
TOPIC: Rural-Urban Labour Market Characteristics Of First Nations \$ 4, 050

UNIVERSITY RESEARCH GRANTS

(a) Brock University General Research Grants (GRGs and others) :

1981-1982	\$ 400
1982-1983	\$ 500
1983-1984	\$ 600
1985-1986	\$ 700
1987-1988	\$ 600
1989-1990	\$2,600
1991-1992 Burgoyne Centre for Entrepreneurship	\$ 300

(b) University of Saskatchewan Research Grants:

1976-1977	\$1,000
1977-1978	\$1,000
1978-1979	\$1,300
1979-1980	\$1,400

TOPIC 6: PROCEEDINGS & NON-REFEREED PUBLICATIONS

TOPIC 6A: PUBLISHED PROCEEDINGS (mostly on Climate Change & Water)

1. "Evaluating the Efficacy of Demand Management Policies in Victoria: a Quantitative Analysis" (with Jack Hull). In Proceedings of 59th Canadian Water Resources Association Annual Congress, Toronto, June 4-7, 2006: Sustainable Water Management.
2. "North Dakota And the Chicago Diversion: A Tale of Two Waters" (with David Whorley) in Proceedings of 58th Canadian Water Resources Association Annual Congress, Montreal, Quebec, June 16-18, 2004, Water and Climate Change: Knowledge for Better Adaptation.
3. "Statistical Downscaling of Precipitation Projections for Niagara Falls and St Catharines, Ontario", in Proceedings of the 57th Canadian Water Resources Association Annual Congress: *Water and climate change: Knowledge for better adaptation*, June 16-18, 2004, Montreal, Qc, Canada.
4. "Alternative Funding Mechanisms for Water Infrastructure Renewal" (with Jack Hull) in INFRA 2003, Proceedings of the 9th Annual Urban Infrastructure Week, Centre for Expertise and Research on Infrastructures in Urban Areas (CERIU), Montreal, Quebec, Nov. 18-20, 2003, 16 pages.
5. "Resilience And Adaptation to Climate Change". Expert Testimony Presented to the Senate of Canada, March 27, 2003. Proceedings of the Standing Committee, Senate of Canada, Second Session, Thirty-seventh Parliament, Second Session, 2002-03, pages 14:31 to 14-49. Also see: Standing Senate Committee on Agriculture and Forestry, Issue No. 14, 2nd Session, 37th Parliament, Ottawa, March 27, 2003, Chapter 5: Effects of Climate Change on Water. URL: Retrieved on May 9, 2026, from: https://sencanada.ca/en/content/sen/committee/372/agr/rep/repintjun03part2-e#_ftnref1
6. "Climate Change and Sustainable Urban Infrastructure: Niagara as a Case Study", (with Chado Brcic), in INFRA 2002, Proceedings of the 8th Annual Urban Infrastructure Week, Centre for Expertise and Research on

Infrastructures in Urban Areas (CERIU), Montreal, Quebec, Nov. 25-27, 2002, 17 pages.

7. "Global Negotiations on Climate Change: Lessons from the Montreal and Kyoto Protocols," in Elizabeth Bamberger (editor), *Proceedings of the Canadian Climate Impacts and Adaptation Research Network*, Inaugural Workshop, Laurentian University, Sudbury, February 21, 2002. See <http://www.c-ciarn-ontario.ca/english/event2.html>
8. "Global Change Land Use Policy on Marginal Lands: the Case of Northern Saskatchewan," (with Suren Kulshreshtha and Mark Johnston). *Proceedings of the 10th Symposium on Global Change Studies*, American Meteorological Society, 10-15 January 1999. (3-page Summary.)
9. "Global negotiations on climate change: lessons from Montreal and Kyoto Protocols," (with Rubén Guevara and Jorge Nogueira). *Proceedings of the 10th Symposium on Global Change Studies*, American Meteorological Society, 10-15 January 1999.
10. "An Ecological - Economic Analysis of the Role of Canadian Forests in Mitigating Global Climate Change," *Proceedings of the International Conference on Sustainable Forests*, May 29-June 1, 1995, Saskatoon, Saskatchewan, organized by Prince Albert Model Forest Association Inc. Forthcoming, 1996 or 1997.
11. "Sustainable Development and the Amazon Rainforest," *Proceedings of the 25th International Symposium on Remote Sensing and Global Change*, Graz, Austria, April 1993. Published by Environmental Research Institute of Michigan.
12. Comments in "Europe 1992 and Implications for Canada," edited by Douglas D. Purvis, Policy Forum Series-21, John Deutsch Institute, Queen's University.
13. "The Optimality properties of a Model with Production," *The Keynes Conference on Methodological Issues in Keynesian Economics*, Trinity College, Cambridge, England, September 12-14, 1983, Cambridge: Cambridge University Press, 1984.
14. "The Timing of Lumpy Investments," in X.J.R. Avula (ed.), *Proceedings of the First International Conference on Mathematical Modelling*, University of Missouri, 1977.

TOPIC 6B: NON-REFEREED PUBLICATIONS

1. "Water Pricing Models, Sustainability and Financial Viability of Small Water Systems in Canada," *Canadian Civil Engineer*, 2012, Winter, Vol 29, No. 5, page 19-22.
2. "Daily Precipitation Projections for the Sooke Reservoir," Brock University Climate Change Lab Report, April 14, 2011. Report prepared for Greater Victoria Water Services Department, 141 pages.
3. "Alternative Funding Mechanisms for Water Infrastructure Renewal" (with Jack Hull) in INFRA 2003, Proceedings of the 9th Annual Urban Infrastructure Week, Centre for Expertise and Research on Infrastructures in Urban Areas (CERIU), Montreal, Quebec, Nov. 18-20, 2003, 16 pages.
4. "Building a Better Tomorrow: Investing in Ontario's Infrastructure to Deliver Real, Positive Change." A submission made to the Ministry of Infrastructure Renewal by the Canadian Water Network. March 31, 2004.
5. "Watershed-Based Source Protection Planning: Comments in Response to (Ontario) Ministry of The Environment's White Paper." A submission made by the Canadian Water Network. April 12, 2004.
6. "The Costs of Landslides in Canada," mimeo, Brock University, April 2003.
7. "The Long-Term and Short-Term Forecasts of Water and Wastewater in the Niagara Region: Volume 1: Main Findings," September 12, 2002.
8. "The Long-Term and Short-Term Forecasts of Water and Wastewater in the Niagara Region: Volume 2: Detailed Statistical Foundations," September 23, 2002.
9. "The Long-Term and Short-Term Forecasts of Water and Wastewater in the Niagara Region: Volume 3: Summary of Water and Wastewater Projections," November 11, 2002.
10. "Global Negotiations on Climate Change: Lessons from the Montreal and Kyoto Protocols," in Elizabeth Bamberger (editor), Proceedings of the Canadian Climate Impacts and Adaptation Research Network, Inaugural Workshop, Laurentian University, Sudbury, February 21, 2002.
11. "Fluoroscopic Techniques for Monitoring Water Quality," A CWN Report prepared for EMS Technologies, January 23, 2002.

12. "The Cost of Adaptation to Climate Change: a Critical Review," (with Ian Burton), for Natural Resources Canada, November 15, 2000.
13. "The Value of Climate Data in Relation to Extreme Weather Events," prepared for Environment Canada, available at: MHI Dore 2000.
https://www.researchgate.net/publication/2456996_The_Value_Of_Climate_Data_In_Relation_To_Extreme_Weather_Events

TOPIC 7: OTHER ACADEMIC ACTIVITY

TOPIC 7A: GUEST EDITOR OF 2 REFEREED JOURNAL ISSUES

1. A Special Memorial Issue honouring the late Edward Lorenz: *Nonlinear Dynamics, Psychology and the Life Sciences*. 2009, Vol. 13, No. 3, 241-350. ISSN# 1090-0578.
2. A Special Issue on Sustainable Forests: Global Challenges and Local Solutions. *Journal of Sustainable Forestry*, Vol. 1, No. 1/ 2, 2000. ISSN # 1054-9811

TOPIC 7B: BOOK REVIEWS

1. Water Policy Entrepreneurs: A Research Companion to Water Transitions around the Globe, edited by Dave Huitema and Sander Meijerink. Edward Elgar, Cheltenham, UK, 2009, 411 pages, £150:00 (hardback), ISBN 9781848443310. In *Science and Public Policy*, Vol 37. No. 7, August 2010, pages 554-556. Co-author, Geoff Black.
2. "John Rawls' *Political Liberalism*: A Review Article," *Brock Review*, 1994, Vol 3, No 2, pp. 180-186.
3. N. Koslov and E. Weitz (eds.) "Nikolai Bukharin: A Centenary Appraisal," NY: Praeger, 1990, in *History of Political Economy*, Vol. 24, No. 1, Spring 1992.
4. W. Semmler (ed.) "Financial Dynamics and Business Cycles," Armonk: New York, M.E. Sharpe, 1989, in *Science and Society*, Vol. 56, No. 1, Spring 1992, pp. 113-116.
5. R. Eisner, "Factors in Business Investment," Cambridge, Mass.: Balinger Publishing Co., 1978, in the *Canadian Journal of Economics*, 1980.
6. C. Bettelheim, "Cultural Revolution and Industrial Organization in China," New York: Monthly Review Press, 1974, in *Journal of Comparative Economics*, Vol.1, no.3, September 1977.

TOPIC 7C: OTHER SCHOLARLY ACTIVITIES

1. Executive Editor, *Brock Review* (from 1991 to 2008)
2. Member of the Editorial Boards of:
 - a. *Atlantic Economic Journal* (1978-2014.)
 - b. *International Advances in Economic Research* (1995-2014)
 - c. *Nonlinear Dynamics, Psychology, and Life Sciences* (since January 1997)

TOPIC 7D: CONSULTING EXPERIENCE

1. Consultant to Victoria Capital Region District, Water Services Division, on Climate Change and Climate Extreme Events, 2007-2008.
2. Consultant to Victoria Capital Region District, Water Services Division on climate change impacts and adaptation, 2004-2005.
3. Consultant to Regional Municipality of Niagara, Water and Wastewater Division, on development of new technology for drinking water security, 2004-2005.
4. Consultant to Geological Survey of Canada, on *The Economic Costs of landslides in Canada. 2003.*
5. Consultant to the Regional Municipality of Niagara on Forecasting Water and Wastewater Demand for Niagara, 2002.
6. Consultant to Geological Survey of Canada, on *The Economic Costs of landslides in Canada. 2003.*
7. Consultant to the Regional Municipality of Niagara on Forecasting Water and Wastewater Demand for Niagara, 2002.
8. Study for the City of Niagara Falls: "*The Economic Impact of the Winter Festival of Lights.*" 1993-1994.
9. Senior Consultant to Consolidated Research Inc., New York (on resource economics including oil), December 1980 to December 1981.
10. Papers prepared for Bell Canada as Consultant (August 1977):
 - i) "The Effects of Divestiture in Terms of the Public Interest — A Present Value Estimate"
 - ii) "International Trade in Telecommunications Equipment".
11. Alternate member of Manpower Planning Committee, Ministry of Development

Planning, Zambia, 1972-1973.

12. Member of United Nations Development Programme team preparing Feasibility Study on Establishing Small Scale Industries in rural Zambia. 1972.

POLICY IMPLICATIONS: FINAL SUMMARY

Like other social scientists , economists engage in many areas of social policy debates. My main research has focused on environmental policy and adaptation to climate change; and better management of water resources and improving drinking water. For both, I have succeeded in changing public policy, in two ways: Canadian water utilities have accepted my advice and planned for climate change impacts. For example, Greater Victoria (BC) expanded its water reservoirs and thus avoided imposing water-rationing. The City of Vancouver did not do that and in 2026 had to impose Stage 3 water-rationing.

On drinking water quality, I recommended the lowering of lead contamination levels in the Canada Drinking Water Guidelines, and Health Canada adopted that recommendation.