H. Damon Matthews

Curriculum Vitae

Department of Geography, Planning and Environment, Concordia University
1455 de Maisonneuve Blvd. W., Montreal, Quebec, H3G 1M8, Canada

email: damon.matthews@concordia.ca

phone: (514) 848-2424 ext 2064
http://www.concordia.ca/faculty/damon-matthews

1 Affiliation and Research Experience

Current Affiliation

1. **Concordia University**, Montreal, Canada — January 2007 – Present
   Department of Geography, Planning and Environment
   - Concordia University Research Chair in Science and Sustainability (June 2012 – Present)
   - Graduate Program Director (June 2011 – Present)
   - Associate Professor (June 2010 – Present)
   - University Research Fellow (2009 / 2010)
   - Assistant Professor (January 2007 – May 2010)

Post-doctoral Research Experience

1. **Carnegie Institution**, Stanford, California — September – December 2006
   - Postdoctoral Researcher, Department of Global Ecology
   - Supervisor: Dr. Ken Caldeira

2. **University of Calgary**, Calgary, Canada — October 2004 – September 2006
   - Postdoctoral Fellow, Department of Geography
   - Supervisor: Dr. Shawn Marshall

2 Educational History

1. **University of Victoria**, Victoria, Canada — September 2000 – August 2004
   - Doctor of Philosophy in Earth and Ocean Sciences (Climate Science)
   - Date Awarded: November 2004
   - PhD Dissertation Title: *Land Cover Change, Vegetation Dynamics and the Global Carbon Cycle: Experiments with the UVic Earth System Climate Model*
   - Supervisor: Dr. Andrew Weaver

2. **Simon Fraser University**, Vancouver, Canada — September 1994 – April 1999
   - Undergraduate Honours Degree in Environmental Sciences (Quantitative Methods)
   - Date Awarded: October 1999

3 Scholarly and Professional Contributions

a. Most Significant Contributions to Research

1. Quantifying the climate response to cumulative carbon emissions

We presented the idea of measuring global climate warming as a function of cumulative emissions of carbon dioxide in 2009 in *Nature* (Matthews et al. 2009). Our finding of a linear relationship between cumulative carbon emissions and global temperature change has proven to be a simple, yet powerful method to estimate the allowable global carbon budgets for climate mitigation targets (Collins et al. 2013). In subsequent publications (Matthews et al. 2012, Matthews and Zickfeld 2012), we proposed a new policy framework to mitigate climate change based on limiting total cumulative emissions. This idea formed a central theme of the U.S. National Academy of Sciences Climate Stabilization Targets report (Solomon et al. 2011), and was also highlighted in the IPCC's Fifth Assessment Report (Collins et al. 2013).

2. Rethinking avoidable and irreversible climate warming

In Matthews and Caldeira (2008) we introduced the idea that eliminating human CO_2 emissions would lead to stable global temperatures which persist for many centuries, challenging the standard concept of continued climate warming from past emissions as a result of climate inertia. Instead, as we argued in Matthews and Weaver (2010), Davis et al. (2010) and Matthews and Solomon (2013), future warming is a unique function of future (rather then past) emissions, which has important implications for the perceived potential of climate mitigation.

3. Identifying national contributions to global warming

In Matthews et al. (2014), we presented a new calculation of individual country contributions to historical climate change, incorporating an improved treatment of national greenhouse gas and aerosol emissions. This study is of considerable relevance to current international negotiations aimed at determining historical responsibility for climate warming as a criteria for setting future emissions allowances, and since publication, has been downloaded more than 21,000 times.

4. Effect of climate change on outdoor hockey and skating in Canada

In Damyanov et al. (2012), we presented the first scientific study of how recently-observed winter temperature increases in Canada have affected the outdoor skating season. We found that winter climate warming has already led to a significant shortening of the season conducive to the creation and maintenance of outdoor rinks. This study was cited by the NHL's 2014 Sustainability Resport, in which they highlighted the potential threat of climate change to professional hockey.

5. Simulating and critiquing the climate response to geoengineering

In Matthews and Caldeira (2007), Ross and Matthews (2009) and Matthews et al. (2009), we assessed the climate and carbon cycle response to geoengineered climate stabilization, higlighting critical risks and uncertainties. In Matthews and Turner (2009) we offered a novel critique of geoengineering, drawing analogy to a range of other human interventions in ecological systems.

b. Publications in Refereed Journals

Student author's names are indicated below in ***bold.***

Submitted

1. Matthews, H. D. Quantifying historical carbon and climate debts. *Nature Climate Change*, submitted February 2015

2. **Leduc, M.**, Matthews, H. D. and de Elia, R. Quantifying the limits of a linear temperature response to cumulative CO2 emissions. *Journal of Climate*, submitted July 2014; revised and resubmitted Feb, 2015.

3. **Simmons, C. T.**, Matthews, H. D. and Mysak, L. A. The role of terrestrial carbon storage as a contributor to the deglacial CO2 rise. *Climate Dynamics*, submitted February 2015.

4. **Gignac, R.** and Matthews, H. D. Allocating a 2C cumulative carbon budget to countries. *Environmental Research Letters*, submitted December 2014.

5. **Landry, J.-S.**, Matthews, H. D. and Ramankutty, N. Global carbon cycle and temperature impacts of future changes in fire regime. *Climatic Change*, submitted October, 2014; revised and resubmitted December 2014.

6. **Moore, T. R.**, Matthews, H. D., **Simmons, C. T.** and **Leduc, M.** Quantifying changes in extreme weather events in response to global temperature increases. *Atmosphere-Ocean*, submitted December 2014.

7. **Graham, T. L.**, Matthews, H. D. and Turner, S. E. Evaluating climatic changes in regions of non-human primate habitat. International Journal of Primatology, submitted September, 2014.

8. McCloskey, S. P. J., Barron, A. B., Matthews, H. D. and Hughes, L., Teaching climate change science: inspiring students beyond acceptance to action. PLOS Biology (Education), submitted September 2014.

Published / In Press

1. Matthews, H. D. (2014) A growing commitment to future CO_2 emissions. *Environmental Research Letters*, 9, 111001.

2. Matthews, H. D. (2014) Warming goal: clear link to emissions. *Nature (Correspondence)*, 514, 434.

3. Reid M. G., Hamilton, C., Reid, S. K., Trousdale, W., Hill, C., Turner, N., Picard, C. R., **Lamontagne, C.** and Matthews, H. D. (2014) Indigenous climate change adaptation planning using a value-focused approach: A case study with the Gitga'at Nation. *Journal of Ethnobiology*, 34, 401–424.

4. Matthews, H. D., **Graham, T., Keverian, S., Smith, T., Seto, D. and Lamontagne, C.** (2014) National contributions to observed global warming. *Environmental Research Letters*, 9, 014010.

5. Turner, S. E., Fedigan, L. M., Matthews, H. D. and Nakamicki, M. (2014) Social consequences of disability in a nonhuman primate. *Journal of Human Evolution*, 68, 47–57.

6. Solomon, S., Pierrehumbert, R., Matthews, H. D., Daniel, J. S. and Friedlingstein, P. (2013) Atmospheric composition, irreversible climate change, and mitigation policy. In: *Climate Science for Serving Society: Research, Modeling and Prediction Priorities*, G.R. Asrar and J.W. Hurrell (eds.). 415–436.

7. Gillett, N. P., Arora, V. K., Matthews, H. D. and Allen, M. R. (2013) Constraining the ratio of global warming to cumulative CO_2 emissions using CMIP5 simulations. *Journal of Climate*, 26, 6844–6858.

8. Markovic, M., de Elia, R., Frigon, A. and Matthews, H. D. (2013) A transition from CMIP3 to CMIP5 for climate information providers: the case of surface temperature over eastern North America. *Climatic Change*, 120, 197–210.

9. Matthews, H. D. and Solomon S. (2013) Reversing excess atmospheric CO_2—Response. *Science*, 340, 1523.

10. Matthews, H. D. and Solomon, S. (2013) Irreversible does not mean unavoidable. *Science*, 340, 438–439.

11. **Brault, M.-O.**, Mysak, L. A., Matthews, H. D. and **Simmons, C. T.** (2013) Assessing the impact of late Pleistocene megafaunal extinctions on global vegetation and climate. *Climate of the Past*, 9, 1761–1771.

12. **Simmons, C.**, Matthews, H. D. and Mysak, L. (2013) Investigating the natural carbon cycle since 8 kyr BP using an intermediate complexity model. *Atmosphere-Ocean*, 51, 187–212.

13. Matthews, H. D. and Zickfeld, K. (2012) Climate response to zeroed emissions of greenhouse gases and aerosols. *Nature Climate Change*, 2, 338–341.

14. Matthews, H. D., Solomon, S. and Pierrehumbert, R. (2012) Cumulative carbon as a policy framework for achieving climate stabilization. *Philosophical Transactions of the Royal Society A*, 370, 4365–4379 .

15. **Damyanov, N**, Matthews, H. D. and Mysak, L. (2012) Observed changes in the outdoor skating season in Canada. *Environmental Research Letters*, 7, 014028.

16. Akbari, H. and Matthews, H. D. (2012) Global cooling updates: reflective roofs and pavements. *Energy and Buildings*, 55,2–6.

17. Turner, S. E., Fedigan, L., Matthews, H. D. and Nakamichi, M. (2012) Disability, compensatory behavior and innovation in free-ranging adult female Japanese macaques (*Macaca fuscata*). *American Journal of Primatology*, 74, 788–803.

18. **Pinsonneault, A.**, Matthews, H. D., Galbraith, E. and Schmittner, A. (2012) Calcium carbonate production response to future ocean warming and acidification, *Biogeosciences*, 9, 2351–2364.

19. **Ross, A.**, Matthews, H. D., Kothavala, Z. and Schmittner, A. (2012) Assessing the effects of ocean diffusivity and climate sensitivity on the rate of climate change. *Tellus B*, 64, 17733.

20. Akbari, H., Matthews, H. D. and **Seto, D.** (2012) The long-term effect of increasing the albedo of urban areas. *Environmental Research Letters*, 7, 024004.

21. Olson, R., Sriver, R., Goes, M., Urban, N. M., Matthews, H. D., Haran, M. and Keller, K. A (2012) climate sensitivity estimate using Bayesian fusion of instrumental observations and an Earth System model. *Journal of Geophysical Research D*, 117, D04103.

22. **Nugent, K.** and Matthews, H. D. (2012) Drivers of future Northern latitude runoff change. *Atmosphere-Ocean*, 50, 197–206.

23. Li, Y., Yang, X., Xiaodong, Z., Mulvill, P. R. and Matthews, H. D. (2011) Integrating climate change factors into China's development policy: Adaptation strategies and mitigation to environmental change. *Ecological Complexity*, 8, 294–298.

24. Zickfeld, K., Eby, M., Matthews, H. D., Schmittner, A and Weaver, A. J. (2011) Nonlinearity of carbon cycle feedbacks. *Journal of Climate*, 24, 4254–4274.

25. **Pinsonneault, A.**, Matthews, H. D. and Kothavala, Z. (2011) Benchmarking climate-carbon models against forest FACE data. *Atmosphere-Ocean*, 49, 41–50.

26. Matthews, H. D. and Weaver, A. J. (2010) Committed climate warming. *Nature Geoscience*, 3, 142–143.

27. Davis, S. J., Caldeira, K. and Matthews, H. D. (2010) Future CO_2 emissions and climate change from existing energy infrastructure. *Science*, 329, 1330–1333.

28. Matthews, H. D. (2010) Can carbon cycle geoengineering be a useful complement to ambitious climate mitigation? *Carbon Management*, 1, 135–144.

29. Gillett, N. P. and Matthews, H. D. (2010) Accounting for carbon cycle feedbacks in a comparison of the global warming effects of greenhouse gases. *Environmental Research Letters*, 5, 034011.

30. Turner S. E., Fedigan, L. M., Nakamichi, M., Matthews, H. D., McKenna, K., Nobuhara, H., Nobuhara, T. and Shimizu, K. (2010) Birth in free-ranging *Macaca fuscata*. *International Journal of Primatology*, 31, 15–37.

31. Matthews, H. D., Gillett, N., Stott, P. and Zickfeld, K. (2009) The proportionality of global warming to cumulative carbon emissions. *Nature*, 459, 829–832.

32. Matthews, H. D. and Turner S. E. (2009) Of mongooses and mitigation: Ecological analogues to geoengineering. *Environmental Research Letters*, 4, 045105.

33. **Ross, A.** and Matthews, H. D. (2009) Climate engineering and the risk of rapid climate change. *Environmental Research Letters*, 4, 045103.

34. Zickfeld, K., Eby, M., Matthews, H. D. and Weaver, A. J. (2009) Setting cumulative emissions targets to reduce the risk of dangerous climate change. *Proceedings of the National Academy of Sciences U.S.A.*, 106, 16129-16134.

35. Matthews, H. D., Cao, L. and Caldeira, K. (2009) Sensitivity of ocean acidification to geoengineered climate stabilization. *Geophysical Research Letters*, L10706.

36. Schmittner, A., Urban, N. M., Keller, K. and Matthews, H. D. (2009) Using tracer observations to reduce the uncertainty of ocean diapycnal mixing and climate-carbon projections. *Global Biogeochemical Cycles*, 23, GB4009.

37. Arora, V. and Matthews, H. D. (2009) Characterizing uncertainty in modelling primary terrestrial ecosystem processes. *Global Biogeochemical Cycles*, GB2016.

38. Matthews, H. D. and Caldeira, K. (2008) Stabilizing climate requires near-zero emissions. *Geophysical Research Letters*, L04705.

39. Plattner, G.-K., et al. (2008) Long-term climate commitments projected with climate-carbon cycle models. *Journal of Climate*, 21, 2721–2751. (Matthews, H. D., co-author)

40. Schmittner, A., Oschlies, A., Matthews, H. D. and Galbraith, E. D. (2008) Future changes in climate, ocean circulation, ecosystems and biogeochemical cycling simulated for a business-as-usual CO_2 scenario until year 4000 AD. *Global Biogeochemical Cycles*, GB1013.

41. Turner, S. E., Fedigan, L. M., Nobuhara, H., Nobuhara, T., Matthews, H. D. and Nakamichi, M. (2008) Monkeys with disabilities: Prevalence and severity of congenital limb malformations in *Macaca fuscata* on Awaji Island. *Primates*, 49, 223–226.

42. Matthews, H. D. and Caldeira, K. (2007) Transient climate-carbon simulations of planetary geoengineering. *Proceedings of the National Academy of Sciences, U.S.A.*, 104, 9949–9954.

43. Matthews, H. D. and Keith, D. W. (2007) Carbon-cycle feedbacks increase the likelihood of a warmer future. *Geophysical Research Letters*, 34, L09702.

44. Matthews, H. D., Eby, M., Ewen, T., Friedlingstein, P. and Hawkins, B. (2007) What determines the magnitude of carbon cycle-climate feedbacks? *Global Biogeochemical Cycles*, 21, GB2012.

45. Matthews, H. D. (2007) Effect of CO_2 fertilization uncertainty on future climate change in a coupled climate-carbon model. *Global Change Biology*, 13, 1068–1078.

46. Matthews, H. D. (2006) Emissions targets for CO_2 stabilization as modified by carbon cycle feedbacks. *Tellus B Special Issue*, 58B, 591–602.

47. Friedlingstein, P. et al. (2006) Climate-carbon cycle feedback analysis, results from the C^4MIP model intercomparison. *Journal of Climate*, 19, 3337-3353. (Matthews, H. D., co-author)

48. Brovkin, V. et al. (2006) Biogeophysical effects of historical land cover changes simulated by six Earth system models of intermediate complexity. *Climate Dynamics*, 26, 587–600. (Matthews, H. D., co-author)

49. Matthews, D. (2006) The water cycle freshens up. *Nature*, 439, 793–794.

50. Matthews, H. D. (2005) Decrease of emissions required to stabilize atmospheric CO_2 due to positive carbon cycle-climate feedbacks. *Geophysical Research Letters*, 32, L21707.

51. Matthews, H. D., Eby, M., Weaver, A. J. and Hawkins, B. J. (2005) Primary productivity control of simulated carbon cycle-climate feedbacks. *Geophysical Research Letters*, 32, L14708.

52. Matthews, H. D., Weaver, A. J. and Meissner, K. J. (2005) Terrestrial carbon cycle dynamics under recent and future climate change. *Journal of Climate*, 18, 1609–1628.

53. Matthews, H. D., Weaver, A. J., Meissner, K. J., Gillett, N. P. and Eby, M. (2004) Natural and anthropogenic climate change: Incorporating historical land cover change, vegetation dynamics and the global carbon cycle. *Climate Dynamics*, 22, 461–479.

54. Meissner, K. J., Weaver, A. J., Matthews, H. D. and Cox, P. M. (2003) The role of land-surface dynamics in glacial inception: A study with the UVic Earth System Climate Model. *Climate Dynamics*, 21, 515–537.

55. Matthews, H. D., Weaver, A. J., Meissner, K. J. and Eby, M. (2003) Radiative forcing of climate by historical land cover change. *Geophysical Research Letters*, 30, 1055.

56. Weaver, A. J., Eby, M., Wiebe, E. C., Bitz, C. M., Duffy, P. B., Ewen, T. L., Fanning, A. F., Holland, M. M., MacFadyen, A., Matthews, H. D., Meissner, K. J., Saenko, O., Schmittner, A., Wang, H., and Yoshimori, M. (2001) The UVic Earth System Climate Model: Model description, climatology and application to past, present and future climates. *Atmosphere-Ocean*, 39, 361–428.

c. Other Refereed Contributions

1. Matthews, H. D. and **Lamontagne, C.** Global Climate Models. *The International Encyclopedia of Geography: People, the Earth, Environment, and Technology*, submitted November 2014; accepted December 2014.

2. Ciais, P. and Sabine, C. et al. (2013) Chapter 6: Carbon and other biogeochemical cycles. In: *Working Group I Contribution to the IPCC Fifth Assessment Report Climate Change 2013: The Physical Science Basis*, Cambridge University Press, Cambridge, U.K. (Matthews, H. D., contributing author).

3. Bindoff, N. and Stott, P. et al. (2013) Chapter 10: Detection and attribution of climate change: from global to regional. In: *Working Group I Contribution to the IPCC Fifth Assessment Report Climate Change 2013: The Physical Science Basis*, Cambridge University Press, Cambridge, U.K. (Matthews, H. D., contributing author).

4. Collins, M. and Knutti, R. et al. (2013) Chapter 12: Long-term climate change: projections, commitments and irreversibility. In: *Working Group I Contribution to the IPCC Fifth Assessment Report Climate Change 2013: The Physical Science Basis*, Cambridge University Press, Cambridge, U.K. (Matthews, H. D., contributing author).

5. Solomon, S., et al. (2011) *Climate Stabilization Targets: Emissions, Concentrations and Impacts over Decades to Millennia,* The National Academies Press, Washington, D.C. (Matthews, H. D., co-author)

6. Matthews, H. D. and Keith, D. (2009) Geoengineering. *The Oxford Companion to Global Change*, Ed. David Cuff and Andrew Goudie, Oxford University Press, Oxford, U.K.

7. Meehl, G. A., Stocker, T. F. et al. (2007) Chapter 10: Global Climate Projections. In: *Climate Change 2007: The Physical Science Basis*, Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, U.K. (Matthews, H. D., contributing author)

8. Matthews, H. D. (2004) Land Cover Change, Vegetation Dynamics and the Global Carbon Cycle: Experiments with the UVic Earth System Climate Model. Ph.D. Dissertation, University of Victoria.

d. Non-Refereed Publications

1. Matthews, H. D. (2013) Emissions cuts made now fight global warming immediately. *The Conversation*, (http://theconversation.com/emissions-cuts-made-now-fight-global-warming-immediately-13561), May 16,
2013.

2. Open Letter to Minister Joe Oliver, re: Alberta tar sands development. Co-signatory, May 7, 2013.

3. Matthews, H. D. (2013) Use less fossil fuel, save outdoor hockey. *The Gazette*, February 5, 2013.

4. Matthews H. D (2012) Sandy a warning about global warming. *The Gazette*, November 6, 2012.

5. Matthews, H. D. (2012) Le plan Harper, un développement non durable. *La Presse* and *Le Devoir*, Op-Ed (in French), April 23, 2012.

6. Matthews, H. D. and Srivastiva, P. (2011) Canada's complacency on climate change is an embarrassment. *Montreal Gazette*, Op-Ed, July 2, 2011.

7. Matthews, H. D. (2009) Sommet de Copenhague – Un Climat Favorable. Op-Ed in *Le Devoir*, December 7, 2009.

8. Matthews, H. D. (2008) Climate change: An emerging framework for environmental education. Proceedings of the International Symposium: Establishing Guidelines for Environmental Education based on Environmental Ethics. University of Malaysia.

9. Matthews, H. D. (2005) Emissions targets for CO_2 stabilization as modified by carbon cycle feedbacks. Extended Abstract, Proceedings of the Seventh International Carbon Dioxide Conference, Denver, CO.

10. Matthews, H. D. (2005) Synergism of terrestrial carbon cycle feedbacks in simulations of future climate change. Extended Abstract, Proceedings of the Seventh International Carbon Dioxide Conference, Denver, CO.

d. Presentations, Seminars and Workshops

Invited Presentations and Seminars

1. **The responsibility of nations: historical contributions to observed warming**
   - Invited Speaker, NCSE Energy and Climate Change Conference, Washington DC, January 2015.

2. **Quantifying historical climate debts among nations**
   - Invited Presentation, American Geophysical Union Fall Meeting, San Francisco, December 2014.

3. **Cumulative carbon budgets for climate mitigation targets**
   - Invited Presentation, International Workshop on Risk Information for Climate Change, Yokohama, Japan, November 2014.

4. **Global warming: Hope or Despair?**
   - Invited Speaker, "Walrus Talks Climate," Ottawa, April 2014.

5. **National contributions to observed global warming**
   - Invited Seminar, Ouranos Research Consortium, Montreal, April 2014.

6. **Cumulative carbon as a new framework for climate mitigation**
   - Invited Seminar, MIT Department of Earth and Planetary Sciences, March 2013.
   - Invited Seminar, Center for Global Change Science, U. Toronto, February 2013.

7. **Global warming in the new millennium**
   - Keynote Speaker, Concordia-Siena Globalization Conference, Montreal, March 2012.
   - Ouranos Consortium, Montreal, June 2011.

8. **Global climate changes and impacts from ongoing greenhouse gas emissions**
   - Managing Climate Change Risks for Pension Investment Funds, Montreal, October 2011.

9. **The oceans and committed climate warming**
   - National Conference on Science, Policy, and the Environment, Wash. DC, January 2011.

10. **Cumulative carbon and the climate mitigation challenge**
    - Department of Biology, Concordia University, February 2011.
    - Department of Geography, University of Montreal, January 2011.
    - Institute for Sustainable Energy, Environment and Economy, Unversity of Calgary, November 2010.

- Department of Earth and Planetary Sciences, McGill University, October 2010.

11. **Potential for mitigation via CO_2 emissions reductions**
    - Royal Society discussion meeting: "Geoengineering – taking control of our planet's climate," London, U.K., November 2010.

12. **Geoengineering**
    - Climate Change Conference 2010, Toronto, ON, August 2010.

13. **Climate change: Science and Solutions.**
    - Marionopolis College Green Week Speaker Series, Montreal, QC, October 2009.

14. **What does it take to stabilize climate? Insights from Earth system models**
    - Department of Geography, McGill University, April 2009.
    - Institute for Atmospheric and Climate Science, ETH Zurich, March 2009.
    - Department of Geography, University of Toronto, November 2008.

15. **Solving the climate problem**
    - AlumNights Panel Series, Montreal, Quebec, November 2008.

16. **Quantifying carbon sinks and feedbacks to climate using Earth system models**
    - CIFAR Oceans Nitrogen Workshop, Toronto, Ontario, November 2008.

17. **Solving the climate problem**
    - AlumNights Panel Series, Montreal, Quebec, November 2008.

18. **What does it take to stabilize climate?**
    - Cutting Edge Lectures, McGill University, October 2008.

19. **Carbon-cycle feedbacks increase the likelihood of a warmer future**
    - 10th International Workshop on Next Generation Climate Models for Advanced High Performance Computing Facilities, Waikiki, Hawaii, February 2008.

20. **Climate change: Science and solutions**
    - Department of Geography, Planning and Environment Seminar Series, Concordia University, Montreal, QC, March 2008.
    - Montreal Inter-University Seminar on the History and Philosophy of Science, Montreal, QC, November 2007.

21. **Transient climate-carbon simulations of planetary geoengineering**
    - American Geophysical Union 2007 Fall Meeting, San Fransisco, CA, December 2007.
    - NASA/AMES Workshop on Managing Solar Radiation, Moffet Field, CA, November 2006.

22. **Geoengineering**
    - Earth and Environmental Systems Institute Seminar Series, Penn State University, University Park, PN, November 2007.

23. **Coupled climate-carbon cycle simulations using the UVic ESCM**
    - Coupled Climate Carbon Cycle Model Intercomparison Project (C^4MIP) Workshop, Exeter, U.K., October, 2006.

24. **Coupling climate and the carbon cycle: Implications for future climate change.**
    - Geosciences Department, Penn State University, University Park, PN, September 2006.
    - College of Oceanic and Atmospheric Sciences, Oregon State U., Corvallis, OR, April 2006.
    - Department of Global Ecology, Carnegie Institution, Stanford, CA, March 2006.
    - Department of Geography, Planning and Environment, Concordia University, Montreal, QC, February 2006.

25. **Modeling terrestrial carbon cycle dynamics and feedbacks to climate.**
    - Department of Atm. and Oceanic Sciences, McGill University, Montreal, QC, April 2005.

26. **The terrestrial carbon cycle and the role of historical land cover change in the UVic Earth System Climate Model.**
    - American Geophysical Union/Canadian Geophysical Union 2004 Joint Assembly, Montreal, QC, May 2004.

Oral Conference Presentations and Seminars

1. **Allocating a 2C carbon budget to nations**
    - American Geophysical Union Fall Meeting, San Francisco, December 2014

2. **National climate footprints: country contributions to observed global warming**
    - Canadian Meteorology and Oceanography Society Meeting, Saskatoon, SK, June 2013.

3. **Identifying regional vulnerabilities of primate populations to continued global warming**
    - International Primatology Society Meetings, Cancun, Mexico, August 2012

4. **Climate response to cumulative greenhouse gas and aerosol emissions**
    - Canadian Meteorology and Oceanography Society Meeting, Montreal, QC, June 2012.

5. **Cumulative carbon as a policy framework for achieving climate stabilization**
    - Canadian Meteorology and Oceanography Society Meeting, Victoria, BC, June 2011.
    - European Geophysical Union Annual General Assembly, Vienna, Austria, April 2011.

6. **Impacts of climate change on non-human primates**
    - International Primatology Society Meetings, Kyoto, Japan, September 2010

7. **Cumulative carbon emissions and committed climate warming**
    - CMOS-CGU Joint Assembly, Ottawa, ON, June 2010.

8. **Climate-carbon sensitivity: a new measure of the climate response to carbon emission**
    - IAMAS-IAPSO-IACS Joint Assembly, Montreal, QC, July 2009.

9. **Sensitivity of ocean acidification to geoengineered climate stabilization**
    - IARU International Climate Change Congress, Copenhagen, Denmark, March 2009.

10. **Stabilizing climate requires near-zero emissions**
    - European Geophysical Union Annual General Assembly, Vienna, Austria, April 2008.

11. **Coupling climate and the carbon cycle: Implications for future climate change.**
    - Department of Atmospheric Physics, Oxford University, Oxford, U.K., March 2006
    - Hadley Centre for Climate Prediction and Research, Exeter, U.K., March 2006.
    - Dialogues in Geography Series, University of Calgary, Calgary, AB, November 2005.

12. **Modeling terrestrial carbon cycle dynamics and feedbacks to climate.**
    - Topics in Atmospheric and Oceanic Sciences Seminar Series, Canadian Centre for Climate Modelling and Analysis, Victoria, B.C., May 2005.
    - Frontier Research Centre for Global Change, Yokohama, Japan, May 2005.

13. **Primary productivity control of simulated carbon cycle-climate feedbacks.**
    - European Geophysical Union Annual General Assembly, Vienna, Austria, April 2005.

14. **Simulating carbon-cycle feedbacks with the UVic Earth System Climate Model.**
    - Coupled Climate Carbon Cycle Model Intercomparison Project (C^4MIP) Workshop, Berkeley, CA, December 2004.

15. **Terrestrial carbon cycle dynamics under recent and future climate change.**
    - Climate Variability and Predictability Workshop, Victoria, BC, February 2004.

16. **Natural and anthropogenic climate change: Incorporating historical land cover change, vegetation dynamics and the global carbon cycle.**
    - International Union of Geodesy and Geophysics General Assembly, Japan, July 2003.
    - Global Biogeochemical Cycles Discussion Group, University of Victoria, BC, July 2003.

17. **Land cover change, vegetation dynamics and the global carbon cycle: Experiments with the UVic Earth System Climate Model.**
    - Arctic Climate Dynamics Discussion Group, University of Calgary, AB, December 2003.

18. **The UVic Earth System Climate Model: A tool for model-based integrated assessment?**
    - Coupling Climate and Economic Dynamics, Montreal, QC, May 2003.

19. **Natural and anthropogenic climate change over the past 300 years: The role of historical land cover change.**
    - Canadian Geophysical Union Conference, Banff, AB, May 2003.
    - Canadian Meteorological and Oceanographic Society Congress, Victoria, BC, April 2003.

20. **El Niño and the Southern Oscillation.**
    - Climate Graduate Students Discussion Group, University of Victoria, BC, March 2003.

21. **The effect of land-use change on 20^{th} century climate as simulated by a climate model of intermediate complexity.**
    - Canadian Geophysical Union Conference, Banff, AB, May 2002.
    - Canadian Meteorological and Oceanographic Society Congress, Victoria, BC, April 2002.
    - Climate Variability and Predictability Workshop, Victoria, BC, February 2002.

22. **Equilibrium and transient simulations of land-use and CO_2 forcing of climate.**
    - European Geophysical Society XXVII General Assembly, Nice, France, April 2002.

Poster Presentations

1. **Climate response to cumulative emissions of greenhouse gases and aerosols**
   - Planet Under Pressure (PLAN) Conference, London, England, March 2012.

2. **Climate response to carbon emissions**
   - IARU International Climate Change Congress, Copenhagen, Denmark, March 2009.

3. **Climate commitment and the 2 degree temperature target**
   - American Geophysical Union 2008 Fall Meeting, San Fransisco, CA, December 2008.

4. **Transient climate-carbon simulations of planetary geoengineering**
   - European Geophysical Union Annual General Assembly, Vienna, Austria, April 2008.

5. **Climate sensitivity to carbon emissions**
   - American Geophysical Union 2007 Fall Meeting, San Fransisco, CA, December 2007.

6. **Carbon cycle feedbacks increase the likelihood of a warmer future**
   - American Geophysical Union 2006 Fall Meeting, San Fransisco, CA, December 2006.

7. **Carbon cycle feedbacks amplify the effect of climate sensitivity uncertainty on future warming**
   - European Geophysical Union Annual General Assembly, Vienna, Austria, April 2006.

8. **Allowable emissions for CO_2 stabilization are strongly determined by future carbon cycle changes**
   - European Geophysical Union Annual General Assembly, Vienna, Austria, April 2006.

9. **Decrease of emissions required to stabilize atmospheric CO_2 due to positive carbon cycle-climate feedbacks**
   - American Geophysical Union 2005 Fall Meeting, San Fransisco, CA, December 2005.

10. **Emissions targets for CO_2 stabilization as modified by carbon cycle feedbacks.**
    - Seventh International Carbon Dioxide Conference, Denver, CO, September 2005.

4 Grants, Scholarships, Awards and Honours Received

Research Grants Applied For

1. **FQRNT Programme de Récherche en Équipe** (PI)
   - *Granting Agency:* Fonds Québécois de la Recherche sur la Nature et les Technologies
   - *Title:* Effect of terrestrial weathering on long-term climate change and carbon cycling
   - *Value:* $180,000 (50%)

Research Grants Received

1. **Research Chair in Climate Science and Sustainability**
   - *Granting Agency:* Concordia University
   - *Title:* Achieving climate stabilization: the challenge of climate mitigation
   - *Principle Investigator:* H. Damon Matthews
   - *Value:* $75,000 *Period Held*: 2012-2016.

2. **NSERC Discovery Grant**
   - *Granting Agency:* Natural Sciences and Engineering Research Council of Canada
   - *Title:* Quantifying the climate response to cumulative greenhouse gas emissions
   - *Principle Investigator:* H. Damon Matthews
   - *Value:* $230,000 ($46,000 / year) *Period Held*: 2012-2016.

3. **NSERC Accelerator Supplement**
   - *Granting Agency:* Natural Sciences and Engineering Research Council of Canada
   - *Title:* Quantifying the climate response to cumulative greenhouse gas emissions
   - *Principle Investigator:* H. Damon Matthews
   - *Value:* $120,000 *Period Held*: 2012-2014.

4. **Collaborative Research and Training Experience (CREATE)** (co-applicant)
   - *Title:* NSERC CREATE Research and Training via an Institute in Water, Energy and Sustainability
   - *Principle Investigator*: Catherine Mulligan (Concordia)
   - *Value:* $1,650,000 (10%) *Period Held*: 2012-2017.

5. **CFCAS Project Supplement**
   - *Granting Agency:* Canadian Foundation for Climate and Atmospheric Sciences
   - *Title:* Climate and carbon cycle implications of future land management in Canada
   - *Principle Investigator:* H. Damon Matthews
   - *Value:* $20,000; *Period Held:* 2012

6. **FQRNT Regroupement Strategique** (co-applicant)
   - *Granting Agency:* Fonds Québécois de la Recherche sur la Nature et les Technologies
   - *Title:* Global Environmental and Climate Change Center (GEC3)
   - *Principle Investigator:* Gail Chmura (McGill)
   - *Value:* $300,000 (5%); *Period Held:* 2011-2012

7. **CFCAS Project Grant**
   - *Granting Agency:* Canadian Foundation for Climate and Atmospheric Sciences
   - *Title:* Probabilistic forecasts of the viability of future Canadian carbon sinks
   - *Principle Investigator:* H. Damon Matthews
   - *Value:* $190,780; *Period Held:* 2008-2009

8. **NSERC Discovery Grant**
   - *Granting Agency:* Natural Sciences and Engineering Research Council of Canada
   - *Title:* Quantifying uncertainties in future carbon cycle feedbacks
   - *Principle Investigator:* H. Damon Matthews
   - *Value:* $110,000; *Period Held:* 2007-2011

9. **FQRNT Nouveaux Chercheurs**
   - *Granting Agency:* Fonds Québécois de la Recherche sur la Nature et les Technologies
   - *Title:* Probabilistic assessment of future terrestrial carbon cycle and climate changes
   - *Principle Investigator:* H. Damon Matthews
   - *Value:* $75,000; *Period Held:* 2007-2008

Awards and Honours Received

1. **Canada Clean50 2015 Honouree**
   - *Granting Agency:* Delta Management Group
   - *Category:* Education and Research
   - *Date Awarded:* September 2014
   - *URL:* www.clean50.com

2. **President's Media Outreach Award – International**
   - *Awarded By:* Concordia University
   - *Date Awarded:* June 2014

3. **Newsmaker of the Week**
   - *Awarded By:* Concordia University
   - *Date Awarded:* March 2012, November 2012, January 2014

4. **Dean's New Scholar Award**
   - *Awarded By:* Faculty of Arts and Science, Concordia University
   - *Value:* $500; *Period Held:* 2009

5. **Concordia University Research Fellow**
   - *Award:* University Research Award
   - *Category:* 'Technology, Industry and Environment' Emerging Category
   - *Value:* $5,000; *Period Held:* 2009

6. **Post-Doctoral Research Fellowships**
   - *Awarded by:* Alberta Ingenuity Fund ($44,000)
   - *Awarded by:* Natural Sciences and Engineering Research Council of Canada ($80,000)

5 Service and Professional Activities

a. Journal Editing

1. **Guest Editor,** Environmental Research Letters Focus Issue: Cumulative Emissions, Global Carbon Budgets and the Implications for Climate Mitigation Targets, November 2014–Present.

b. Conference Session Organization

1. **Session Convenor,** "Historic Emissions and the Question of Responsibility for Climate Change Loss and Damage, Adaptation and Mitigation," Our Common Future under Climate Change, Paris, July 2015.
2. **Session Convenor,** "Fossil fuel infrastructure and climate change mitigation: emerging perspectives," Our Common Future under Climate Change, Paris, July 2015.
3. **Session Convenor,** "From Carbon Emissions to Climate Change," Canadian Meteorological and Oceanographic Society Congress, June 2015.
4. **Session Convenor,** "Historic Contributions: the Common but Differentiated Responsibility Challenge," NCSE Energy and Climate Change conference, January 2015.
5. **Session Convenor,** "Connecting Climate Impacts to Cumulative Carbon Emissions and Linking Biophysical Functions to Human Values," American Geophysical Union Fall Meeting, San Francisco, December 2014.
6. **Session Convenor,** "Climate Change and the Carbon Cycle," Canadian Meteorological and Oceanographic Society Congress, June 2010, 2011, 2012, 2013.
7. **Session Convenor,** "Climate Change Impacts and Stabilization III: Stabilization Prospects, Trajectories, and Uncertainties," American Geophysical Union Fall Meeting, December 2008.

c. External Committees and Workshops

1. **Workshop Organizer** UVic Earth System Climate Model Developers Workshop, Victoria, BC, May 2015.
2. **Member,** U.S. CLIVAR Working Group on Ocean Carbon Cycling in CMIP5 Models, June 2009 – Present.
3. **Member,** U.S. National Academy of Sciences Committee on Stabilization Targets for Atmospheric Greenhouse Gas Concentrations, Washington DC, September 2009 – April 2010.
4. **Participant,** D.O.E. Carbon Cycling and Biosequestration Workshop, Washington DC, March 2008.
5. **Participant,** Climate Engineering Workshop, Harvard University, Boston, October 2007.

d. Media and Public Relations

Media Coverage

1. **General Media Activities**
   - Feature interview: "Le comptable de l'atmosphere" (the atmospheric accountant), in *La Presse Plus*, December 30, 2013.
   - "'It's not too late' to stop climate spiral, Montreal scientist says," in *The Montreal Gazette*, September 27, 2013.
   - Op-Ed published in *Le Devoir* and *The Montreal Gazette*, February 20, 2013.
   - Op-Ed published in *Le Devoir* and *The Montreal Gazette*, November 5, 2012.
   - Op-Ed published in *Le Devoir* and *Journal de Montreal*, April 23, 2012.
   - Op-Ed published in *The Montreal Gazette*, July 2, 2011.
   - Op-Ed published in *Le Devoir*, Montreal, December 7, 2009.
   - Live radio call-in show on "Radio Noon", *CBC Radio Montreal*, December 2009.
   - "Concordia prof gets grant for climate research" In: *The Concordian* (Concordia University Weekley Newspaper), September 2008.
   - "Damon Matthews: Chasing climate change." In: *Concordia Journal* (Concordia University Weekly Newspaper), January 2007.

2. **Selected coverage:** *National contributions to historical global warming* (Matthews et al., 2014)
   - *New Scientist*, *Bloomberg Business Week*, *the Huffington Post*, *the U.K. Times* (and other international news), January 2014.

3. **Selected coverage:** *Irreversible does not mean unavoidable* (Matthews and Solomon, 2013)
   - *Climate Central* and *Huffington Post*, March 2013.

4. **Selected coverage:** *Effect of climate change on outdoor skating* (Damyanov et al., 2012)
   - *New York Times*, *The Guardian*, *Le Monde*, *Toronto Star*, *Globe and Mail*, *National Post*, *PBS Newshour*, *Météo Média* (and other national/international news), March 2012.

5. **Selected coverage:** *Infrastructural Emissions Commitment* (Davis et al., 2010)
   - *Le Monde*, *CBC News*, *Canwest News*, (and other international news), September 2010.

6. **Selected coverage:** *Carbon Emissions for 2-Degrees Warming* (Matthews et al., 2009)
   - *Montreal Gazette*, *Canwest News*, *CBC Radio*, *CBC Television*, *Radio Canada*, (and other national news) June 2009.

7. **Selected coverage:** *Climate stabilization requires near-zero emissions* (Matthews and Caldeira, 2008)
   - *The Washington Post* (page A1), *New Scientist Environment*,*The Montreal Gazette*, *The Victoria Times Colonist* (and other national/international news), February 2008.

8. **Selected coverage:** *Geoengineering* (Matthews and Caldeira, 2007)
   - *Aerospace America*, *ABC News*, *Nature Reports Climate Change*,*New Scientist Environment*,*ScienceNOW Daily News*,*Scientific American*, (and other international news), July 2007.

Journal Highlights of Publications

1. **Environmental Research Web**, January 2014.
   - "Climate change: who's the biggest emitted of them all?", highlighting Matthews et al. (2014) in *Environmental Research Letters*.

2. **Environmental Research Web**, March 2012.
   - "Warming climate is bad news for Canadian outdoor skating", highlighting Damyanov et al (2012) in *Environmental Research Letters*.

3. **Environmental Research Web**, October 2009.
   - "Of mongooses and men: why aerosol geoengineering could prove risky", highlighting Matthews and Turner in *Environmental Research Letters*.

4. **AGU Journal Highlight**, March 2008.
   - "Stabilizing climate requires near-zero emissions", highlighting Matthews and Caldeira (2008) in *Geophysical Research Letters*.

5. **PNAS Commentary**, June 2007.
   - "Evaluating a technological fix for climate", by Peter G. Brewer, highlighting Matthews and Caldeira (2007) in *Proceedings of the National Academy of Sciences*.

6. **AGU Journal Highlight**, December 2005.
   - "A decrease of emission is required to stabilize atmospheric CO_2", highlighting Matthews (2005) in *Geophysical Research Letters*.

e. University and Departmental Service and Committees

1. Graduate Program Director (M.Sc.) June 2011 – June 2013
   - Department of Geography, Planning and Environment, Concordia University

2. Graduate Program Committee June 2011 – June 2013
   - Department of Geography, Planning and Environment, Concordia University

3. Ad-hoc Ph.D. Proposal Development Committee November 2009 – June 2013
   - Department of Geography, Planning and Environment, Concordia University

4. Ad-hoc Departmental Workload Committee December 2008 – April 2010
   - Department of Geography, Planning and Environment, Concordia University

5. Departmental Research Liaison September 2008 – April 2010
   - Department of Geography, Planning and Environment, Concordia University

6. Departmental Seminar Series Coordinator September 2008 – December 2009
   - Department of Geography, Planning and Environment, Concordia University

7. Faculty Search Committee January – April 2008
   - Department of Geography, Planning and Environment, Concordia University

8. Department Chair Search Committee January – April 2008

- Department of Geography, Planning and Environment, Concordia University

9. Departmental Curriculum Committee September 2008 – August 2009
   - Department of Geography, Planning and Environment, Concordia University

f. Reviewer Contributions

1. **Peer-Reviews of Journal Manuscripts**
   - 1 *Carbon Management* manuscript: 2011 (1)
   - 3 *Climatic Change* manuscripts: 2011 (1); 2009 (1); 2008 (1)
   - 1 *Climatic Change Letters* manuscript: 2012 (1)
   - 4 *Climate Dynamics* manuscripts: 2004 (1); 2005 (1); 2006(1); 2007(1).
   - 10 *Environmental Research Letters* manuscripts: 2014 (1); 2012 (3); 2011 (2); 2009 (3); 2011 (1)
   - 1 *EOS* manuscript: 2007 (1).
   - 7 *Geophysical Research Letters* manuscripts: 2005 (1), 2006(1), 2007(1), 2008 (1). 2009(2), 2010(1).
   - 1 *Geophysical Model Development* manuscript: 2009 (1)
   - 2 *Global Change Biology* manuscript: 2010 (1); 2007 (1).
   - 12 *Journal of Climate* manuscripts: 2004 (1); 2005 (3); 2007 (2); 2009 (2); 2010 (1); 2012 (2); 2013 (1).
   - 6 *Nature* manuscripts: 2005 (2), 2006 (2), 2008 (1), 2009 (1).
   - 9 *Nature Climate Change* manuscripts: 2012 (3); 2013(3) 2014 (3)
   - 1 *Nature Geosciences* manuscript: 2007 (1).
   - 2 *Proceedings of the National Academy of Sciences USA* manuscript: 2009 (1); 2014 (1)
   - 1 *Philosophical Transactions of the Royal Society of London* manuscript: 2011 (1).
   - 1 *Science* manuscript: 2013 (1)
   - 1 *Water Resources Research* manuscript: 2006 (1).

2. **Other Peer-Reviews**
   - Textbook proposal review, Oxford University Press, June 2013.
   - Intergovernmental Panel on Climate Change Working Group 1: Fifth Assessment Report, Chapters 6, 8 and 12, October 2012.
   - Wiley and Sons textbook chapters (3), June 2012.
   - Pearson Canada textbook proposal, March 2010.
   - NSERC Discovery Grant proposal, January 2010.
   - Intergovernmental Panel on Climate Change Working Group 1: Fourth Assessment Report, Chapters 2, 7 and 10, November 2005.

g. Memberships in Professional Societies

1. **Canadian Meteorology and Oceanography Society:** Member, 2008-present.

2. **American Geophysical Union:** Member: 2004-present.

6 Training of High Quality Personnel

6.1 Summary of Current and Past Supervision

	Current		Completed		
	Supervised	**Co-supervised**	**Supervised**	**Co-supervised**	**Total**
Honours students			5	1	6
Masters students	5	1	4	3	13
Ph.D. students		1		1	2
Post-docs	3		1		4
Total	8	2	10	5	25

6.2 Current Student Research Topics

1. Martin Leduc (Post-doctoral researcher)
   - *Topic:* Assessing uncertainties and limits associated with the climate response to cumulative greenhouse gas emissions.
   - *Presentation:* Ouranos Research Seminar, Montreal, April 2014
   - *Invited presentation:* Canadian Meteorological and Oceanographic Society, Whistler, BC, June 2014
   - *Poster:* American Geophysical Union, San Fransisco, December 2014

2. Christopher Simmons (Post-doctoral researcher)
   - *Topic:* Modelling peatland carbon dynamics since deglaciation
   - *Poster:* American Geophysical Union, San Fransisco, December 2014

3. Antti-Ilari Partanen (Post-doctoral researcher)
   - *Topic:* Climate and health effects of aerosol mitigation scenarios

4. Marc-Olivier Brault (Ph.D. Student, McGill University)
   - Co-supervised with Lawrence Mysak
   - *Topic:* Effect of terrestrial weathering on long-term climate and carbon cycle changes.

5. Cassandra Lamontagne (M.Sc. Student)
   - Co-supervised with Monica Mulrennan
   - *Topic:* Impacts of climate change on a coastal First Nations community.

6. Tanya Graham (M.Sc. Student)
   - *Topic:* Quantifying mammalian vulnerability to global climate changes.

7. Daniel Horen Greenford (M.Sc. Student)
   - *Topic:* Historical national contributions from a range of greenhouse gases and aerosols.

8. Caroline-Sophie Gauvreau (M.Sc. Student)
   - Co-supervised with David Greene
   - *Topic:* Impact of climate change on plant phenology.

9. Loukia Papadopoulos (M.Sc. Student)

- *Topic:* Nationally Appropriate Mitigation Strategies.

10. Trevor Smith (M.Sc. Student)
    - *Topic:* Impacts of climate change on Quebec viticulture.

6.3 Completed Student Theses

1. Christopher Simmons (Ph.D. Dissertation, McGill University): Completed October 2013.
    - Co-supervised with Lawrence Mysak
    - *Topic:* Carbon cycle dynamics since the last glacial maximum.
    - *Presentation:* European Geophysical Union, Vienna, April 2013.
    - *Poster:* American Geophysical Union, San Francisco, December 2013.

2. Travis Moore (M.Sc. Thesis): Completed September 2013
    - *Topic:* Quantifying extreme weather events as a function of global mean temperature change

3. Marc-Olivier Brault (M.Sc. Thesis, McGill University): Completed August 2012.
    - Co-supervised with Lawrence Mysak
    - *Topic:* Effect of Pleistocene megafauna on early Holocene climate.
    - *Presentation:* CMOS Assembly, Montreal, QC, May 2012.
    - *Poster:* American Geophysical Union, San Francisco, December 2012.

4. Nikolay Damyanov (M.Sc. Thesis, McGill University): Completed August 2011.
    - Co-supervised with Lawrence Mysak
    - *Topic:* Effect of winter warming on outdoor skating in Canada.
    - *Presentation:* CMOS Assembly, Victoria, BC, June 2011.

5. Andrew Pinsonneault (M.Sc. Thesis): Completed August 2011.
    - *Topic:* Effect of ocean acidification on the marine carbonate cycle.
    - *Presentation:* CMOS Assembly, Victoria, BC, June 2011.

6. Karen Paquin (M.Sc. Thesis): Completed April 2011.
    - Co-supervised with Jochen Jaeger
    - *Topic:* Potential for carbon sequestration in boreal forest woodlots.

7. Andrew Ross (M.Sc. Thesis): Completed July, 2010.
    - *Title:* Probabilistic assessment of the rate of future climate change.
    - *Poster:* CMOS-CGU Joint Assembly, Montreal, QC, June 2010.

8. Alex Matveev (M.Sc. Thesis): Completed August, 2009.
    - *Title:* Evaluating the land use change carbon flux and its impact on climate.
    - *Poster:* European Geophysical Society General Assembly, Vienna, April 2009.
    - *Poster:* IAMAS-IAPSO-IACS Joint Assembly, Montreal, QC, July 2009.

9. Tanya Graham (Honours Thesis): Completed April 2013
    - Co-supervised with Sarah Turner
    - *Topic:* Impact of climate change on primate populations.

- *Presentation:* AFCAS conference, Montreal, May 2014
- *Presentation:* Ouranos Research Seminar, Montreal, April 2014.

10. Trevor Smith (Honours Thesis): Complete April 2012
    - *Topic:* Metrics for comparing the climate effect of different greenhouse gases.
    - *Poster:* CMOS Assembly, Montreal, QC, May 2012.

11. Serge Keverian (Honours Thesis): Completed April 2011
    - *Topic:* Regional attribution of carbon emissions and climate change.

12. Kelly Nugent (Honours Thesis): Completed April, 2010.
    - *Topic:* Drivers of North American continental runoff and implications for ocean circulation
    - *Poster:* CMOS-CGU Joint Assembly, Montreal, QC, June 2010.

13. Andrew Pinsonneault (Honours Thesis): Completed April, 2009.
    - *Title:* Climate model reliability in simulating enhanced forest productivity resulting from CO_2 fertilization.
    - *Poster:* IAMAS-IAPSO-IACS Joint Assembly, Montreal, QC, July 2009.

14. Andrew Ross (Honours Thesis): Completed April, 2008.
    - *Title:* Impact of geoengineering on the rate of climate warming.
    - *Poster:* American Geophysical Union Fall Meeting, San Francisco, December 2008

7 Teaching

a. Courses Taught

1. **Human Environment 665Q: Quantitative Research Methods**
    - Department of Geography, Planning and Environment, Concordia University.
    - Graduate-level course (13 students), Fall 2012.
    - *Topics Covered:* Experimental design and quantitative analysis, basic statistical tests, linear and multiple linear regression, analysis of variance, mixed effect models, R programming.

2. **Geology 440: Current Research in Environmental Earth Sciences**
    - Department of Geography, Planning and Environment, Concordia University.
    - Upper-level (fourth-year) undergraduate course (20 students), Fall 2011.
    - *Topics Covered:* Paleoclimate; climate change; water resources; air quality and health; energy resources; life and ecosystems.

3. **Geography 498C: Climate Change—Science, Impacts and Policy**
    - Department of Geography, Planning and Environment, Concordia University.
    - Upper-level (fourth-year) undergraduate course (18 students), Winter 2008; Fall 2009; Winter 2011.

- *Topics Covered:* The climate system; Greenhouse effect; Carbon cycle; Past climate change; Climate modeling and predicting future climate change; Climate impacts; International climate policy; Energy alternatives.

4. **Human Environment 615: Research Group Seminar**
   - Department of Geography, Planning and Environment, Concordia University.
   - Graduate-level course (6 students), Winter 2009.
   - *Topics Covered:* Literature review; Development and framing of research questions; Presentation of proposed research; Poster presentation techniques; Public event organization.

5. **Human Environment 655: Environmental Modeling**
   - Department of Geography, Planning and Environment, Concordia University.
   - Graduate-level course (8-14 students), Winter 2008; 2009; 2012.
   - *Topics Covered:* Introduction to systems dynamics modeling; Use of computer modeling software; Basic differential equations; Formulation and validation of systems dynamic models; Application of models to environmental and policy problems.

6. **Geography 378: The Climate System**
   - Department of Geography, Planning and Environment, Concordia University.
   - Upper-level (third-year) undergraduate course (45-60 students), Fall 2007; 2008.
   - *Topics Covered:* Climate system components (Atmosphere, Ocean, Cryosphere, Biosphere, Lithosphere); Today's climate system; Plate tectonics and tectonic-scale climate change; Past greenhouse and icehouse climate; Orbital-scale climate change; Glacial-interglacial cycles; Last-glacial maximum; Holocene; Historical climate changes.

7. **Geography 398C: Climate Change—Science, Impacts and Policy**
   - Department of Geography, Planning and Environment, Concordia University.
   - Upper-level (third-year) undergraduate course (35 students), Winter 2007.
   - *Topics Covered:* The climate system; Greenhouse effect; Carbon cycle; Past climate change; Climate modeling and predicting future climate change; Climate impacts; International climate policy; Energy alternatives.

8. **Geography 305: Introduction to Weather and Climate**
   - Department of Geography, University of Calgary.
   - Introductory (second-year) undergraduate course (100 students), Fall 2005.
   - *Topics Covered:* Atmospheric structure; Radiation; Greenhouse effect; Climate change; Seasons; Humidity and stability; Clouds and precipitation; Atmospheric circulation; Mid-latitude cyclones; Thunderstorms, tornadoes and hurricanes; Weather forecasting.

9. **Environmental Management 6130: Climate Dynamics and Modeling**
   - University of the West Indies, Barbados.
   - 3-week intensive master's level course (6-7 students), April 2004; January 2005.
   - *Topics Covered:* Global energy balance; Atmospheric radiative transfer; Modeling clouds in the climate system; Surface energy balance; Atmospheric boundary layer; Hydrological cycle; Modeling the surface water balance; Climate sensitivity, feedbacks and forcing.