Resume of: Adrian Unc

Plant and Environmental Sciences
New Mexico State University (NMSU)
Skeen Hall, N336
aunc@nmsu.edu

EDUCATION:

Ph.D. **Soil Science**
Land Resource Science Dept., University of Guelph, Guelph, Ontario, 2002
- Dissertation: Importance of manure properties on the survival and transport of manure bacteria through the vadose zone [the interaction of physico-chemical and microbiological components of manure, soils and water and their significance on the microbial contaminant risk of water resources]

M.Sc. **Soil Science**
Land Resource Science Dept., University of Guelph, Guelph, Ontario, 1999
[assessment of the microbial and nutrient leaching risks associated with land application of livestock manure]

B.Sc. Degree of **Agricultural Engineer/Agronomist** (major Agriculture, minor Soil Science) - (corresponding to a North-American B.Sc. in Agricultural Sciences as assessed by the specialized services at the University of Toronto) University of Timisoara, Romania, 1990
- Undergraduate research thesis (2 years agronomic research): "The effect of a crop of Sorghum saccharatum on the properties of a saline soil (solonetz)"

EXPERTISE:

- Interdisciplinary soil science and water quality research
- Evaluation of the impact of human activities on environmental quality with focus on on-farm soil and water
- Assessment/development of environmental standards and practices
- Microbial environmental standards; microbial ecology; waste treatment; nutrient management practices and impacts; the Rural/Urban environmental interface;
- Broad soil science, agronomy, microbiology, plant science, physics, and chemistry educational background
- Teaching experience in soil sciences and environmental quality
- Management of scientific, human and financial resources of complex interdisciplinary projects and teams including researchers, industry members, public organizations, technicians, students and administrative staff
- Preparation of reports, protocols, scientific and popular press publications
- Public speaking and presentation of research results to technical and non-technical audiences (local, national and international)

PROFESSIONAL EXPERIENCE:

- 2003-2007 Research Scientist, and 2002 - 2003 Postdoctoral fellow (supervisor S.A. Sattar), Centre for Research on Environmental Microbiology, University of Ottawa:
    - devise and manage interdisciplinary soil science and environmental quality research projects (impact on soil and water quality and soil fertility following after land application of organic residuals and significance of farm management practices)

    - manage scientific, human resource and financial aspects of interdisciplinary research teams comprised of scientists, engineers, technical staff and students
    - interact with diverse researchers in a multidisciplinary environment
    - direct participation in field experimentation
    - devise projects for and supervision of students and technicians (e.g. the student J. Altosaar was awarded the third place in junior biotechnology at the 2006 Canada Wide Science Fair)
    - interact with agricultural and rural stakeholders, and governmental agencies
- 2006, Lecturer –Land and Water Stewardship, University of Guelph - Kemptville Campus
- 2003-2005 Special Graduate Faculty member, University of Guelph (co-supervised Joanna Passmore, MSc Student who conducted research in Ottawa)
    - contaminant soil science
- 2002, Lecturer - Soil and Water Conservation and Remediation, University of Guelph
- 1999-2002, Teaching Assistant, University of Guelph, Departments of Land Resource Science and Crop Sciences:
    - Agrifood Systems (spring 2002),
    - Soil and Water Conservation and Remediation (summer and fall 1999, 2000 & 2001),
    - Soil Biology (spring 2001),
    - Introductory Soil Science (spring 2000)
- 1996-2002, Research Assistant, University of Guelph
    - Monitor nutrient and microbial quality of groundwater under one of the University of Gueph's agricultural research station
    - Work toward an MSc and a PhD degree in the area of environmental sustainability of agricultural practices with focus on nitrate transport and contaminant microbiology.
- 1992-1995 Business manager, private sector, Romania
- 1990-1991, Soil Scientist, Ministry of Agriculture, Office for Soil Science and Agrochemical Studies, Timisoara, Romania
    - soil surveying and mapping
    - agrochemical studies for farm management purposes

Relevant projects (at University of Ottawa):

- Quantifying the risk of pathogens from agricultural enterprises entering water resources
- Impact of pulp and paper biosolids on soil fertility and crop yield
- Reduction of *E. coli* O157:H7 contamination in manure using bacteriophages
- Microbial quality of on-farm water and its impact on the sanitation of milking systems

- Options for suitable national pathogen standards in agricultural settings based on a critical evaluation of existing national and international pathogen benchmarks of environmental quality related to agriculture and/or water quality protection
- Preparation of a technical training manual for land application of organic wastes in conjunction with Ontario's Nutrient Management Act – (bio-safety and land application of agricultural and non-agricultural organic wastes chapters).
- Constructive solutions to water quality issues on Ontario dairy farms
- Factors affecting microbial contamination of ground and surface water during and after application of municipal biosolids and the impact of best management practices (BMP's) to mitigate these factors
- Development of an environmental microbial index-scoping study
- Milkhouse water quality pilot study: Contamination of source water for milkhouse cleansing
- Development of an integrated systematic approach to evaluate microbiological quality and agronomic utility aspects of organic waste treatment technologies – Growth trials

PUBLICATIONS

Peer Reviewed Articles, Book Chapters, and Proceedings:

1. Springthorpe, S., **Unc, A.,** and Sattar, S.A. 2007. *Escherichia coli* in drinking water sources and distribution system biofilms. Proceedings of the 12th Canadian National Conference and 3rd Policy Forum on Drinking Water. In print, accepted Jan. 2007
2. **Unc, A.**, J. Gardner, S. Springthorpe. 2006. Recovery of soil *E. coli* after addition of sterile organic wastes, Applied and Environmental Microbiology, 72: 2287–2289
3. **Unc, A.**, M.J. Goss. 2006. Culturable *Escherichia coli* in soil mixed with two types of manure, Soil Science Society of America Journal, 70:763-769
4. W. Curnoe, D.I. Irving, C.B. Dow, G. Velema, **A. Unc**, 2006. Effect of spring application of a paper mill-soil-conditioner on corn yield and soil fertility, Agronomy Journal 98: 423-429
5. **Unc, A.**, M.J. Goss. 2006. Impact of organic waste amendments on soil hydraulic properties and on water partitioning, Journal of Environmental Engineering and Science, 5: 243–251
6. **Unc, A.**, M.J. Goss. 2004. Transport of microorganisms from manure and the protection of water resources, Applied Soil Ecology, 25:1-18
7. **Unc, A.**, M.J. Goss, S. Springthorpe, S.A. Sattar. 2004. Role of the surface charge properties for bacterial retention in soils; significance of soluble and colloidal organic matter in suspension., Proceedings of the 9th European Biosolids and Organic Residuals Conference, CD-ROM
8. **Unc, A.**, M.J. Goss. 2003. Movement of faecal bacteria from manure through the vadose zone., Water, Air and Soil Pollution, 149:327-337
9. **Unc, A.**, M.J. Goss. 2003. Impact of manure properties on the survival of manure *Escherichia coli* in soils, Proceedings of the 2nd Canadian Organic Residuals Recycling Conference, CD-ROM
10. **Unc, A.**, M.J. Goss, S. Springthorpe, S.A. Sattar. 2003. Factors important for the transport and survival of microbes from residual materials (manure/biosolids) applied to land, Proceedings of the 2nd Canadian Organic Residuals Recycling Conference, CD-ROM

11. **Unc, A.** and Goss, M.J. 2002. Movement of pathogenic bacteria from manure to groundwater resources, in: Kocasoy, G., Atabarut, T., and Nuhoğlu, İ. (Eds.) *Appropriate Environmental And Solid Waste Management And Technologies For Developing Countries*, vol. 3, pp. 1539-1546, ISWA World Congress Proceedings, July 2002 Istanbul, Turkey
12. **Unc, A.**, M.J. Goss. 2002. Manure impact on the field movement and survival of enteric bacteria, AICF National Conference on Agricultural Nutrients and Their Impact on Rural Water Quality, CD-ROM
13. **Unc, A.**, M.J. Goss. 2000. Development of a protocol for sampling faecal coliform bacteria originating from manure in the vadose zone., Water Quality Research Journal of Canada, 35:23-28
14. Goss, M.J., **Unc, A.**, and Chen, S. 2000. Transport of nitrogen, phosphorus, and microorganisms from manure into surface- and groundwater, *In*: Balázs, E., Galante, E., Lynch, J.M., Schepers, J.S., Toutant, J.-P., Werner, D. and Werry, P.A.T.J. (Eds.). *Biological Resource Management - Connecting Science and Policy*, pp. 31-55, Springer Verlag, Berlin, Germany

SCIENTIFIC AND TECHNICAL REPORTS

- **Unc, A.**, Fisher, J., Murthy, K., Hiratsuka, K., "Transport of *E. coli* O157:H7 and associated coliphages through three soil types of contrasting properties" Report submitted to GangaGen Inc. and Dairy Farmers of Ontario, May 2006, 30 pages, Technical Report
- Goss, M.J., **Unc, A.**, Passmore, J., Springthorpe, S.V., Sattar, S. A., "Factors affecting microbial faecal contamination of ground and surface water during and after application of municipal biosolids and the impact of best management practices (BMP's) to mitigate these factors" Report Submitted to the Ontario Ministry of Environment, Ontario Ministry of Agriculture and Rural Affairs, and Agriculture Canada, February 2006, 71 pages, Technical Report
- **Unc, A.**, Kinsley, C., and Springthorpe, S., "Options for suitable national pathogen standards in agricultural settings based on a critical evaluation of existing national and international benchmarks of environmental quality related to agriculture and/or water quality protection" Report submitted to Environment Canada, National Guidelines and Standards Office, May 2005, 127 pages – Scientific Report
- **Unc, A.** and Weil, C., "Constructive solutions to water quality issues on Ontario dairy farms", Literature review report to Dairy Farmers of Ontario, December 2003, 139 pages, Scientific Report
- Goss, M.J., Rudra, R., Snyder, L., Barry, D.A.J., **Unc, A.**, McCoy, A., Schiefer K., and Passmore J., "Report of a scoping study for an agro-ecosystem indicator of the risk of water contamination by pathogens from agricultural operations", report to Agriculture and Agri-Food Canada and Ontario Ministry of the Environment, May 2003, 115 pages, Scientific Report
- Goss, M.J., McCoy, A., **Unc, A.**, Burr, S., and Barry, D.A.J., "Milkhouse water quality pilot study: Contamination of source water for milkhouse cleansing", Report to Dairy Farmers of Ontario, January 2003, 20 pages - Technical Report

CONFERENCE ABSTRACTS:

1. Springthorpe, S., and **Unc, A.** 2006. Detection of soil and water *E. coli* after addition of organic nutrient sources. The 3rd Canadian Water Network - Connecting Water Resources, November 20-23, Montreal QC
2. **Unc, A.**, and Springthorpe S., 2006. Cultivability and detection of soil and water *Escherichia coli* after addition of organic nutrient sources. 11th International Symposium on Microbial Ecology. August 20-25, Vienna, Austria

3. **Unc, A.**, Sharpe, P.H., Pitty Del Cid, J., Springthorpe, S., Sattar, S.A. and Goss, M. 2006. Impact of cattle grazing management on microbial indicators of fecal pollution. Joint Colloquium of the Canadian Society of Animal Science and the Canadian Society of Agronomy and the Canadian Society for Horticultural Sciences, August 1-4, Halifax NS
4. Sharpe, P.H., **Unc, A.**, Pitty del Cid, J., Marcellisen, P., Knight, D.R., and Goss, M.J. 2006. Drinking and defecating frequencies and locations are affected by the presence of a water trough when cattle graze near a creek. Joint Colloquium of the Canadian Society of Animal Science and the Canadian Society of Agronomy and the Canadian Society for Horticultural Sciences, August 1-4, Halifax NS
5. Goss, M.J., **Unc, A.**, Richards, C., Heck, R., Dunfield, K., and Lammerding, A. 2006. Development of a risk-based index of the potential for pathogens from agricultural activity to impact source waters. Proceedings of the 13th Annual International Conference on the St. Lawrence River / Great Lakes Ecosystem Source Water Protection – Part II – Progress and Challenges, St. Lawrence River Institute of Environmental Sciences**,** May 16 – 18th**,** Cornwall ON
6. **Unc, A.**, Goss, M.J., Passmore, J., Springthorpe, S.V., Kinsley, C., and Sattar, S.A. 2006 How and why do microbes reach groundwater – a review. Proceedings of the 13th Annual International Conference on the St. Lawrence River / Great Lakes Ecosystem Source Water Protection – Part II – Progress and Challenges, St. Lawrence River Institute of Environmental Sciences**,** May 16 – 18th**,** Cornwall ON
7. **Unc, A.**, and Springthorpe, S. 2006. Environmental water quality: nutrients and microbial contamination of surface waters. Proceedings of the 13th Annual International Conference on the St. Lawrence River / Great Lakes Ecosystem Source Water Protection – Part II – Progress and Challenges, St. Lawrence River Institute of Environmental Sciences**,** May 16 – 18th**,** Cornwall ON
8. **Unc, A.**, and Springthorpe, S., and Sattar, S.A. 2006. Microbial faecal and non-faecal indicators of water contamination. Proceedings of the 13th Annual International Conference on the St. Lawrence River / Great Lakes Ecosystem Source Water Protection – Part II – Progress and Challenges, St. Lawrence River Institute of Environmental Sciences**,** May 16 – 18th**,** Cornwall ON
9. Springthorpe, S., **Unc, A.**, and Sattar, S.A. 2006. Escherichia coli in drinking water sources and distribution system biofilms. 12th Canadian National Drinking Water Conference, April 1-4, Saint John NB
10. Gardner, J., and **Unc, A.**, 2005. *E. coli* from agricultural lands; what are we measuring? Proceedings of the 12th Annual International Conference on the St. Lawrence River / Great Lakes Ecosystem Source Water Protection, St. Lawrence River Institute of Environmental Sciences**,** May 16 – 18th**,** Cornwall ON
11. Passmore, J., and **Unc, A.** 2005. Biosolids and vertical transfer of microbes through soils; experimental results. Proceedings of the 12th Annual International Conference on the St. Lawrence River / Great Lakes Ecosystem Source Water Protection, St. Lawrence River Institute of Environmental Sciences**,** May 16 – 18th**,** Cornwall ON
12. Springthorpe, S., **Unc, A.**, and Sattar, S.A. 2005. Microbial indicators of water quality - what are we measuring? Proceedings of the 12th Annual International Conference on the St. Lawrence River / Great Lakes Ecosystem Source Water Protection, St. Lawrence River Institute of Environmental Sciences**,** May 16 – 18th**,** Cornwall ON
13. Passmore, J.,Goss, M.J., and **Unc, A.** 2004. Factors affecting the transport of pathogens from biosolids through the vadose zone. ASA-CSSA-SSSA Annual Meetings, Oct. 31 - Nov. 4, Seattle WA
14. **Unc, A.**, Passmore, J., Goss, M.J., Sattar, S.A. and Springthorpe, S. 2004. Evaluation of microbial water quality risks associated with the land application of biosolids; tests on hydrologically isolated plots. Proceedings of the 20th Eastern Regional Conference of the Canadian Association On Water Quality. Carleton University, the Institute For Environmental Engineering, October 29th, Ottawa ON

15. Goss, M.J., Passmore, J., and **Unc, A.** 2004. Transport of Pathogens from Sewage Biosolids. International Association for Great Lakes Research 2004 Conference, May 24-28, Waterloo ON

16. **Unc, A.**, Goss, M.J., Springthorpe, S., and Sattar, S.A. 2004. An integrated experimental approach for evaluating the contaminant risk associated with the land application of biosolids. International Association for Great Lakes Research 2004 Conference, May 24-28, Waterloo ON

17. Topp, E., and **Unc, A.,** 2004, Beneficial Management Practices to Reduce Pathogens / Chemicals Movement from Biosolids Application to Tile Drains, Water Environment Association of Ontario (WEAO) Biosolids Seminar Biosolids Seminar, February 12, Hamilton ON

18. Passmore, J.,Goss, M.J., and **Unc, A.** 2003. Parameters Affecting the Preferential Transport of Microbial Pathogens from Biosolids through the Vadose Zone. ASA-CSSA-SSSA Annual Meetings, Nov. 2-6, Denver CO.

19. **Unc, A.**, Goss, M.J., Passmore, J., and Springthorpe, S. 2003. Transport of bacteria through soil columns in the presence of surfactants. ASA-CSSA-SSSA Annual Meetings, Nov. 2-6, Denver CO.

20. Goss, M., **Unc, A.**, Barry, D.A.J., Topp E., Ho, T., 2003. Development of an index for the risk of contamination of water resources by pathogens, ASA-CSSA-SSSA Annual Meeting, Nov. 2-6, Denver CO

21. **Unc, A.**, Goss, M.J., Springthorpe, S., and Sattar, S.A., 2003. Factors important for the transport and survival of microbes from residual materials (manure/biosolids) applied to land. Proceedings of the 2nd Canadian Organic Residuals Recycling Conference, April 24 and 25, 2003, British Columbia Water and Waste Association, Penticton BC

22. **Unc, A.**, and Goss, M.J. 2002. Movement of pathogenic bacteria from manure to water resources (groundwater). International Solid Waste Association 2002 World Environment Congress and Fair, July 8-12, 2002, Istanbul, Turkey

23. **Unc, A.**, Goss, M.J., 2003. Impact of manure properties on the survival of manure *Escherichia coli* in soils. Proceedings of the 2nd Canadian Organic Residuals Recycling Conference, April 24 and 25, 2003, British Columbia Water and Waste Association, Penticton BC

24. **Unc, A.**, Goss, M.J., 2002. Manure impact on the field movement and survival of enteric bacteria. Proceedings of the National Conference on Agricultural Nutrients and Their Impact on Rural Water Quality, Agricultural Institute of Canada Foundation, April 29 to 30, 2002, Waterloo ON

25. **Unc. A.**, and Goss, M.J. 2002. Importance of manure properties for the vadose zone transport and survival of manure bacteria. ASA-CSSA-SSSA Annual Meeting, Nov. 10-14, Indianapolis IN

26. **Unc, A.**, and Goss, M.J. 2002. Survival of manure *Escherichia coli* in soil as affected by manure properties. ASA-CSSA-SSSA Annual Meeting, Nov. 10-14, Indianapolis IN

27. **Unc, A.** and Goss, M.J. 2002. Impact of manure components on the initial attachment of bacteria and artificial microspheres to soil surfaces. International Conference on Water and Health, Sept. 2002, Ottawa ON

28. Goss, M.J. and **Unc, A.** 2001. Contamination of water resources by microbes originating from farms. The 8th Latornell Annual Symposium, Nov. 2001, Alliston ON

29. **Unc, A.** and Goss, M.J. 2001. Impact of manure components on bacteria retention by soils. ASA-CSSA-SSSA Annual Meeting, Oct. 21-25,, Charlotte NC

30. **Unc, A.** and Goss, M.J. 2001. Impact of manure on soil physical properties relevant to bacterial transport, CSSS/IHSS Annual Meeting, Aug. 2001, Guelph ON

31. Conboy, M.J., **Unc, A.**, Barry, D.A., and Goss, M.J. 2000. Factors influencing the transport of bacteria through the vadose zone to ground water. ASA-CSSA-SSSA Annual Meeting, Nov. 5-9, 2000, Minneapolis MN
32. **Unc, A.**, and Goss, M.J. 2000. Effects of applying manure on soil properties relevant to bacterial transport. ASA-CSSA-SSSA Annual Meeting, Nov. 5-9, Minneapolis MN
33. **Unc, A.**, Goss, M.J., and Whiteley, H.R. 1999. Transport of faecal bacteria from manure through the vadose zone, CAWQ (Canadian Association for Water Quality) 34th Central Canadian Symposium, February 8-9, Burlington ON
34. **Unc, A.** and Goss, M.J. 1998. Transport of faecal bacteria under field conditions, ASA-CSSA-SSSA Annual Meeting, *Oct. 19–22*, Baltimore MD
35. Goss, M.J., Conboy, M.J., and **Unc, A.**, 1998. Contamination of groundwater by bacteria from animal manure, British Soil Science Society Annual Meeting, Sept. 1998, Belfast UK
36. Goss, M.J., Conboy, M.J., and **Unc, A.** 1997. Contamination Of Groundwater By Bacteria From Animal Manure, ASA-CSSA-SSSA Annual Meeting, Oct. 26–31, Anaheim CA

Popular press

- **Unc**, A., and C. Weil. 2004. Potable water: What you need to know about this essential ingredient for top-quality milk, The Milk Producer, 80:20-24

TECHNOLOGY TRANSFER

Unc, A. and Weil, C., 2004, "Water used to wash milk contact surfaces", (water quality brochure and spreadsheet assessment tool) Dairy Farmers of Ontario

The chapter published in collaboration with M.J. Goss and S. Chen (2000) on the transport of contaminants identifies the water quality issues related to animal manure. It was used as a contribution to establishing priorities for research within OECD countries.

Results obtained during the Ph.D. work on the impact of the transport of bacteria from manure on water quality were extensively quoted at the Walkerton Inquiry in a reviewed commission paper (Goss, M.J., Rollins, K.S., McEwan, K., Shaw, J.R. and Lammers-Helps, H. Manure Management regulations and Practices. Walkerton Inquiry Commissioned Paper 6. Toronto: Ministry of the Attorney General, April 2002) and presented during the Part I hearings of the inquiry in the expert testimony of Dr. M.J. Goss.

Knowledge from the M.Sc. and Ph.D. work was used by to create a pathogen index in an extension to a Decision Support System for manure management at farm level (M-CLONE 4).

PEER REVIEWING ACTIVITY

I carried out peer reviews for the:

- Journal of Environmental Quality
- Journal of Environmental Management
- Canadian Journal of Soil Science

HONORS AND AWARDS INFORMATION:

- 2002 - Ontario Graduate Scholarship, Government of Ontario, University of Guelph, Excellence in Research ($5,000)

- 2001 - Ontario Graduate Scholarship, Government of Ontario, University of Guelph, Excellence in Research ($10,000)
- 2001 - Ontario Graduate Scholarship in Science and Technology, Government of Ontario, University of Guelph, Excellence in Research ($5,000)
- 2000 – Taffy Davidson Scholarship, University of Guelph, Excellence in Research ($ 500)
- 2000 - University Graduate Scholarships, University of Guelph, Excellence in Education ($ 2,000)
- 1999, Mary Edmunds Williams Scholarship, University of Guelph, Excellence in Research ($ 5,000)
- 1997 - University Graduate Scholarships, University of Guelph, Excellence in Education ($ 2,000)
- 1996 - University Graduate Scholarships, University of Guelph, Excellence in Education ($ 2,000)

INVITED EXPERT AND LECTURER

- Invited Expert - Nutrient Management Joint Research Program Communication Workshop, February 21, 2006, Guelph ON. Organized by Ontario Ministry for Agriculture, Food and Rural Affairs.
- Invited Expert - Expert Workshop on Quantitative Microbiological Risk Assessment, January 24-25, 2006, Toronto, ON. Organized by Health Canada and Ontario Ministry of Environment
- Invited Lecturer - Graduate course module "Biofilms in Soils and Plants" as part of the "Biofilms in Medicine and the Environment" course. Department of Biochemistry, Microbiology and Immunology, University of Ottawa, spring semester - 2006.
- Invited Speaker - Biochemistry, Microbiology and Immunology Seminar Series, October 24, 2005. University of Ottawa (Soils and the Microbial Indicators of Water Quality)
- Invited Speaker - Ottawa-Carleton Geoscience Centre, Department of Earth Sciences, University of Ottawa, September 23, 2004. "Bacterial transport in soils: how do manure components alter factor significance"
- Invited Expert - Environmental Advisory Committee, City Of Ottawa. Sept. 16, 2004
- Invited Speaker - Workshop - Biosolids and Manure Workshop, December 2003. Organized by the Ontario Rural Wastewater Centre
- Invited Speaker - Dairy Farmers of Ontario Professional Development Program, May 19, 2004, Picton ON, Canada
- Invited Expert (Environmental Quality) - Dairy Farmers of Ontario Annual Meeting Toronto, January 13-14, Toronto ON Canada
- Invited Lecturer - Undergraduate course module – "Soil-Plant-Atmosphere Water Relations" as part of the "Soil Plant Relations" course, Department of Land Resource Science, University of Guelph, spring semester 2001.

MEMBERSHIP INFORMATION:
Soil Science Society of America, American Society for Microbiology, International Society for Microbial Ecology, Ontario Institute of Agrology

LANGUAGE SKILLS:
English: Reading fluent, Writing fluent, Speaking fluent
Romanian: Reading fluent, Writing fluent, Speaking fluent
French: Reading functional, Writing basic, Speaking basic
German: Reading functional, Writing basic, Speaking functional