

Gideon Wolfaardt

*Associate Professor and Canadian Research Chair in Environmental Interfaces and Biofilms
Dept of Chemistry and Biology, Ryerson University,*

Gideon Wolfaardt is an environmental microbiologist and a Canada Research Chair in Biofilms and Interfaces. The central question of his work is to evaluate the degree that biofilms and the extracellular polymeric substances that they produce facilitate interactions between microbial communities and their physical, biological and chemical environment, and how this knowledge can be applied in engineered and industrial applications. Current projects include a variety of fundamental studies on biofilm form and function, as well as applied research on topics including wastewater treatment, microbial conversion of biomass, environmental behavior of pathogens, and the environmental fate and behaviour of genetically modified microbes. He has published more than 70 peer-reviewed articles and book chapters

Professional Preparation

University of Pretoria	Major: Microbiology	BSc Hons, 1988
University of Pretoria	Major: Industrial Microbiology	MSc, 1990
University of Saskatchewan	Major: Environmental Microbiology	PhD, 1994

Appointments

August 2004 to present: Associate professor and CRC, Ryerson University

October 1999 to July 2004: Associate professor, University of Stellenbosch.

January 1999 to September 1999: Senior lecturer, University of Stellenbosch.

1995 to 1998: Professional research associate and adjunct professor, U. of Saskatchewan.

Scholarly & Professional Activities

Sub-Editor of Canadian Journal of Microbiology, **Editorial board** of Microbial Ecology (1999-2005). **Regular reviewer** for 6 journals.

Society Memberships and other responsibilities

American Society for Microbiology

Canadian Society for Microbiology (Executive Board Member)

International Symposium for Microbial Ecology (Advisory Board Member 1998)

The International Biodeterioration Society (Council member 2001)

Water Institute of South Africa (past Board Member of Special Division on Rural Water Supply)

South African Society for Microbiology (Board Member 2000 - 2004)

Ad hoc reviewer for the US NHI and NSF

Appointed reviewer for European Science Foundation 2005 to present.

Winetech (South Africa) Cultivation and Biotechnology Committees; member 2000 - 2004

South African Water Research Commission committee member 2002 – 2004.

Recent (2001 - present) research collaborations with other groups (only where active exchange occurred, and where students were involved or co-supervised)

Dr. P. Rohns - Düsseldorf Waterworks, Germany

Dr. S. Saftic – Berna Biotech, Bern, Switzerland

Prof. S. Møller - The Technical University of Denmark, Lyngby, Denmark

Dr. M. Grossmann - Dept Microbiol and Biochem, Research Institute Geisenheim, Germany

Mr. J. Booysen – Winetech, South Africa

Mr. J-P. Rossi - Lesaffre International, France

Prof. L. Lorenzen - Chem Eng. Stellenbosch University, South Africa

Prof. E. Jacobs - Polymer Science, Stellenbosch University, South Africa

Prof. A. Botha – Department of Microbiology, Stellenbosch University, South Africa

Prof. F. Bauer – Institute for Wine Technology, Stellenbosch University, South Africa
 Dr. J. Maree - CSIR, South Africa
 Mrs. R Augustyn – Escom (Electricity Supply Commission of South Africa)
 Prof. P. Weimer – USDA, Wisconsin, MA
 Prof. L. Lynd - Dartmouth College, NH
 Prof. B. Sleep - University of Toronto, Dept of Civil Eng.
 Prof. E. Edwards – University of Toronto, Dept of Applied Chemistry and Chemical Eng.
 Dr. Michael Arts – Environment Canada
 Dr. Ian Droppo – Environment Canada

Graduate supervision

Theses completed as supervisor

MSc: 11

PhD: 3

As co-supervisor

8

2

Currently supervise 2 PhD and 6 Masters candidates; co-supervise 1 PhD candidate.

Selected recent research contributions

a) Refereed journal publications (names of trainees in bold)

- Wolfaardt, G.M., M.J. Hendry, **T. Birkham, A. Bressel, M.N. Gardner, A.J. Sousa**, D.R. Korber, and M. Pilaski. 2008. Microbial response to environmental gradients in a ceramic-based diffusion system. *Biotechnol. Bioeng.* In Press. DOI: 10.1002/bit.21736
- Wolfaardt, G.M., M.J. Hendry², and D.R. Korber. Microbiology of saturated, high pH, uranium-mine tailings, Saskatchewan, Canada. *Can. J. Microbiol.* Accepted.
- Wolfaardt, G.M., D.R. Korber, and J.R. Lawrence. 2007. Cultivation of microbial communities. In: *Manual for Environmental Microbiology*. C.J. Hurst, R.L Crawford, G.R. Knudsen, M.J. McInerney, and L.D. Stetzenbach (Eds) ASM Press. Pp 101-111.
- Johnson, S.A.**, S. Jackson, V.R. Abratt, G.M. Wolfaardt, R. Cordero-Otero and S.W. Nicolson. 2006. Xylose utilization and short-chain fatty acid production by selected components of the intestinal microflora of a rodent pollinator (*Aethomys namaquensis*). *J. Comp. Physiol. B.* 176: 631–641.
- Joubert, L-M.**, A. Botha and G.M. Wolfaardt. 2006. Microbial Exopolymers Link Predator and Prey in a Model Yeast Biofilm System. *Microb. Ecol.* 52:187-197.
- Lynd, L.R., P.J. Weimer, G.M. Wolfaardt, Y-H. P. Zhang. 2006. Cellulose Hydrolysis by *Clostridium thermocellum*: A Microbial Perspective. In: Kataeva I.A., Ed. "Cellulosome". In series "Molecular Anatomy and Physiology of Proteinaceous Machines" (Uversky V.N., series Ed.). Nova Science Publishers, Inc., Hauppauge, NY, USA. ISBN: 1594549508, pp 95-117.
- Maré, L.**, G.M. Wolfaardt, and L.M.T. Dicks. 2006. Adhesion of *Lactobacillus plantarum* 423 and *Lactobacillus salivarius* 241 to the intestinal tract of piglets, as recorded with fluorescent *in situ* hybridization (FISH), and production of plantaricin 423 by cells colonized to the ileum. *J. Appl. Microbiol.* 100:838-845.
- Weimer, P.J., N.P.J. Price, **M. Kroukamp, L-M. Joubert**, G.M. Wolfaardt, and W.H. Van Zyl. 2006. Studies on the Extracellular Glycocalyx of the Anaerobic Cellulolytic Bacterium *Ruminococcus albus* 7. *Appl. Environ. Microbiol.* 72: 7559-7566.
- Bester, E.**, G.M. Wolfaardt, **K. Garny L-M. Joubert** and S. Saftic. 2005. Planktonic cell yield by a pseudomonad biofilm. *Appl. Environ. Microbiol.* 71:7792-7798.
- Du Plessis, K.R.**, A. Botha, **L. Joubert, R. Bester**, W.J. Conradie and G.M. Wolfaardt. 2005. Microbial community response to copper oxychloride in acidic sandy loam soil. *J. Appl. Microbiol.* 98:901-909.
- Saftic, S., **L. Joubert, E. Bester**, and G. Wolfaardt. 2005. A biofilm apparatus for the teaching laboratory. *American Society for Microbiology - Focus on Microbiology Education.* 11:12-14.
- Qi, B.**, G.M. Wolfaardt, C. Aldrich, and L. Lorenzen. 2005. Acidogenic fermentation of lignocellulose substrate with activated sludge. *Chem. Engin. Comm.* 192:1221–1242.

- Bauer, F. F., S. Dequin, I.S. Pretorius, **H. Schoeman**, G.M. Wolfaardt, M.B. Schroeder and M.K. Grossmann. 2004. The assessment of the environmental impact of genetically modified yeast strains. *Bulletin de l'O.I.V.* 515-528.
- Coetzee, G., L. Malandra**, G.M. Wolfaardt, M. Viljoen-Bloom. 2004. Dynamics of a microbial biofilm in a rotating biological contactor for the treatment of winery effluent. *Water SA* 30:407-412.
- Qi, B.**, C. Aldrich, L. Lorenzen and G.M. Wolfaardt. 2004. Degradation of humic acids in a microbial film consortium from landfill compost. *Ind. Engin. Chem. Res. J.* 43:6309-6316.
- Qi, B.**, C. Aldrich, L. Lorenzen and G.M. Wolfaardt. 2004. Effect of ultrasonication on the humic acids extracted from lignocellulose substrate decomposed by anaerobic digestion. *Chem. Engin. J.* 98:153-163.

b) Selected recent invited presentations

- Wolfaardt, G.M. 2007. Adaptive community behavior in biofilms and impact on survival fitness. BIOME Canada, one day special symposium on biofilms. Ottawa.
- Wolfaardt, G.M. 2007. Biofilm Plasticity: Adaptive Microbial Behaviour Linking Fundamental Research and Bioprocessing. Dept. of Applied Chemistry and Chemical Engineering, University of Toronto.
- Wolfaardt, G.M. 2007. Channeling of energy and carbon – a strategy for biofilm resilience. Canadian Society for Microbiologists Annual Conference, Quebec City.
- Wolfaardt, G.M. 2007. Resource sharing and carbon channelling – a basis for biofilm activity in natural and engineered systems. European Science Foundation Exploratory Workshop on 'Valuing Biofilms', Lunz am See, Austria.
- Wolfaardt, G.M. 2007. The Slime Matrix: What, Where, Why? - Structure and Function, Chemistry, Visualization. Panel discussion member. 4th American Society for Microbiology Conference on Biofilms, Quebec City.
- Wolfaardt, G.M. 2007. Biofilms, Surface Microbiology, and Biomass Conversion. Thayer School of Engineering, Dartmouth College, NH.