David Ross Nielsen

Postdoctoral Fellow
Department of Chemical Engineering, Massachusetts Institute of Technology
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Education

Ph.D., Queen's University at Kingston, 2006
Chemical Engineering
- 'Development of a Partitioning Bioscrubber Process for the Treatment of Waste Gases Containing Toxic Volatile Organic Compounds'

B.S., University of Colorado at Boulder, 2001
Chemical Engineering
- With High Distinction
- Materials Science Option
- Minor in Chemistry
- Cumulative GPA: 3.93

Selected Publications

Nielsen, D.R., Daugulis, A.J., and McLellan, P.J., (2007), Dynamic Simulation of Benzene Vapor Treatment by a Two-Phase Partitioning Bioscrubber. Part I: Model Development, Parameter Estimation, and Parametric Sensitivity, *Biochem. Eng. J.*, In Press.

Nielsen, D.R., Daugulis, A.J., and McLellan, P.J., (2007), Dynamic Simulation of Benzene Vapor Treatment by a Two-Phase Partitioning Bioscrubber. Part II: Model Calibration, Validation, and Predictions, *Biochem. Eng. J.*, In Press.

Nielsen, D.R., Sask, K.N., McLellan, P.J., and Daugulis, A.J. (2006), Benzene Vapor Treatment using a Two-Phase Partitioning Bioscrubber: An Improved Steady-State Protocol to Enhance Long-Term Operation, *Bioproc. Biosyst. Eng.*, 29(4): 229-240.

Nielsen, D.R., McLellan, P.J., and Daugulis, A.J. (2006), Direct Estimation of the Oxygen Requirements of *Achromobacter xylosoxidans* for Aerobic Degradation of Monoaromatic Hydrocarbons (BTEX) in a Bioscrubber, *Biotechnol. Lett.*, 28(16): 1293-1298.

Nielsen, D.R., Daugulis, A.J., and McLellan, P.J. (2005), Transient Performance of a Two-Phase Partitioning Bioscrubber Treating a Benzene-Contaminated Gas Stream, *Environ. Sci. Technol.*, 39(22): 8971-8977.

Nielsen, D.R., Daugulis, A.J., and McLellan, P.J. (2005), A Restructured Framework for Modeling Oxygen Transfer in Two-Phase Partitioning Bioreactors, *Biotechnol. Bioeng.*, 91(6): 773-777.

Nielsen, D.R., Daugulis, A.J., and McLellan, P.J. (2005), Quantifying Maintenance Energy Requirements from the Steady-State Operation of a Two-Phase Partitioning Bioscrubber, *Biotechnol. Bioeng.*, 90(2): 248-257.

Nielsen, D.R., Daugulis, A.J., and McLellan, P.J. (2003), A Novel Method of Simulating Oxygen Transfer in Two-Phase partitioning Bioreactors, *Biotechnol. Bioeng*, 83(6): 735-741.

Ma, H., Nielsen, D. R., Bowman, C. N., and Davis, R. H. (2001), Membrane Surface Modification and Backpulsing for Wastewater Treatment, *Sep. Sci. Tech.*, 36: 1553-1569.

Conference Proceedings

Canadian Society of Chemical Engineers Annual Meeting - 2005, Toronto, ON

Ontario-Quebec Biotechnology Meeting – 2005, Kingston, ON
- Honorable mention in poster presentation competition

1st International Conference on Environmental, Industrial, and Applied Microbiology (BioMicroWorld-2005) – 2005, Badajoz, Spain

Ontario-Quebec Biotechnology Meeting – 2004, Quebec City, PQ

Canadian Society of Chemical Engineers Annual Meeting - 2003, Hamilton, ON

Ontario-Quebec Biotechnology Meeting – 2003, Waterloo, ON
- Honorable mention in oral presentation competition

Canadian Society of Chemical Engineers Annual Meeting - 2002, Vancouver, BC

Scholarly Awards

Governor General's Gold Medal
Queen's University, May 2007
- Awarded to the student who achieves the highest academic standing at the graduate level

NSERC Postdoctoral Fellowship
(Natural Sciences and Engineering Research Council of Canada) April 2006
- Awarded based on academic excellence, research ability and potential, and communication, interpersonal and leadership abilities

Ontario Graduate Scholarship in Science and Technology
September 2005
- Awarded based on demonstrated academic and research excellence

J.H. Stewart Reid Memorial Fellowship Trust
September 2005
- Awarded annually to one Doctoral student in Canada based on demonstrated academic and research excellence

NSERC Graduate Fellowship (PGSA and PGSB)
(Natural Sciences and Engineering Research Council of Canada) September 2001
- Awarded based on academic excellence, research ability and potential, and communication, interpersonal and leadership abilities

Max S. Peters Outstanding Senior Award
University of Colorado, Chemical Engineering, May 2001

Kazuka Boe Outstanding Junior Award
University of Colorado, Chemical Engineering, May 2000

AIChE Donald F. Othmer Top Sophomore Award
University of Colorado, Chemical Engineering, May 1999

Professional Experience

Process Improvement Engineer, Roche Colorado
Boulder, CO, Summer 2001

- Investigated influences on resin loading as the first step in solid phase peptide synthesis

Research Assistant, University of Colorado
Boulder, CO, September 2000 – January 2001

- Studied thermocapillary motion of droplets, focusing on performance simulated under low-gravity conditions

Process Support Engineer, Chevron Phillips Chemical
Kingwood, TX, Summer 2000

- Evaluated available technology for aromatics extraction from reformate

Research Assistant, University of Colorado
Boulder, CO, September 1999 – May 2000

- Studied polymer membrane cross-flow microfiltration, where surface modification and backpulsing were used to reduce membrane fouling

Teaching Experience and Awards

Xiaoting Liu Award

- Chemical Engineering Department, Queen's University, 2006
- For "enhancement of the quality of the teaching and learning environment for students"

Teaching Assistant

- Chemical Reaction Engineering, Wastewater Engineering, Introduction to Microbiology, Laboratory, Chemical Engineering Laboratory
- Participation in optional Teaching and Learning Workshops at Queen's University

Assistant Supervisor of 3 Undergraduate Thesis Projects

Assistant Supervisor of an NSERC Undergraduate Summer Research Project

Other Professional Experience

Graduate representative on Promotion, Tenure, and Review committee

- Queen's University, Department of Chemical Engineering, Fall 2003-Winter 2004

Participated on new faculty member search committee

- Queen's University, Department of Chemical Engineering, Spring 2002