

Alexis J. de Kerchove

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Education

Yale University – New Haven, CT, USA

2003 – 2007 Ph.D. Candidate in Chemical Engineering, Environmental Engineering Program
Advisor: Dr Menachem Elimelech
Project: *Deposition kinetics of Pseudomonas aeruginosa to alginate conditioning film*

2002 – 2003 Master of Sciences, Chemical Engineering, Environmental Engineering Program
Advisor: Dr Menachem Elimelech

Université Catholique de Louvain (UCL) – Louvain-la-Neuve, Belgium

2001 – 2002 Master of Chemical and Bio-Industry Engineering – Visiting guest at **Oxford University** (United Kingdom)
Advisor: Dr Marc Boutry (UCL, BE) – Co-Advisor: Dr Ian Moore (Oxford University, UK)
Project: *Detection and Analysis of Membrane Traffic Defects in Arabidopsis thaliana*

2000 – 2001 Master of Sciences, Biology

Advisor: Dr Jean-François Rees

Project: *Biochemical study of the metabolism of two deep-sea demersal fish, Coryphaenoides (N.) armatus and Antimora rostrata*

1996 – 2000 Bachelor of Chemical and Bio-Industry Engineering

1996 – 2000 Bachelor of Sciences, Biology

Publications

de Kerchove, A. J. and Elimelech, M., Deposition Kinetics of Motile and Non-Motile *Pseudomonas aeruginosa*: Impact of Alginate Conditioning Film, Applied and Environmental Microbiology, *Submitted*

de Kerchove, A. J. and Elimelech, M., Formation of Polysaccharide Gel Layers in Presence of Ca²⁺ and K⁺ Ions: Measurements and Mechanisms, Biomacromolecules, **2007**; 8 (1); 113-121.

de Kerchove, A. J. and Elimelech, M., Structural Growth and Viscoelastic Properties of Adsorbed Alginate Layers in Monovalent and Divalent Salts, Macromolecules, **2006**, 39 (19), 6558-6564

de Kerchove, A. J. and Elimelech, M., Relevance of Electrokinetic Theory for "Soft" Particles to Bacterial Cells: Implications for Bacterial Adhesion, Langmuir, **2005**, 21 (14), 6462-6472

de Kerchove, A. J., Genard, A., Bailey, D. M., Bagley, P. M., Collins, M. A., Priede, I. G., and Rees, J.-F., Apparent violation of the decrease in metabolism with depth paradigm: Comparison of metabolic enzymes in muscles of two demersal deep-sea fish, Journal of Experimental Marine Biology and Ecology, *Submitted*

Publication in Progress

de Kerchove, A. J. and Elimelech, M., Deposition Kinetics of PA01 *Aflc ApilA* and PA01 *ApilA* on Alginate Films: Roles of Divalent Cations, Applied and Environmental Microbiology, *In preparation*

de Kerchove, A. J. and Elimelech, M., Enhancement of Cell Deposition and Maximum Surface Coverage of *Pseudomonas aeruginosa* by Cell Motility, Langmuir, *In preparation*

Presentations

de Kerchove, A. J. and Elimelech M. "Role of Alginate Conditioning Film in the Deposition Kinetics of Flagellated *Pseudomonas aeruginosa* in a Radial Stagnation Point Flow Chamber" Presented at the Robert M. Langer Graduate Student Symposium, Yale University, New Haven, CT, 2006

de Kerchove, A. J. and Elimelech, M. "Role of Alginate Conditioning Film in the Deposition Kinetics of *Pseudomonas aeruginosa* in a Radial Stagnation Point Flow Chamber" Presented at the American Chemical Society 232th National Meeting, San Francisco, CA, 2006

de Kerchove, A. J. and Elimelech, M. "Role of Divalent Cations in the Deposition Kinetics of *Pseudomonas aeruginosa* on Quartz Surfaces" Presented at the American Chemical Society 232th C National Meeting, San Francisco, CA, 2006

de Kerchove, A. J. and Elimelech, M. “Effect of Monovalent and Divalent Electrolytes on the Adsorption of Polysaccharides on Solid Surfaces in Aquatic Systems” Presented at the American Chemical Society 78th Colloid and Surface Science Symposium, Clarkson University, Potsdam, NY, 2005

de Kerchove, A. J. and Elimelech, M. “Multi-Layer Adsorption of Sodium Alginate on Quartz Surfaces: A QCM-D Study of Adsorbed Layer Properties” Presented at the American Chemical Society 78th Colloid and Surface Science Symposium, Clarkson University, Potsdam, NY, 2005

de Kerchove, A. J. and Elimelech, M. “Relevance of the Soft Particle Outer-Surface Potential to Bacterial-Surface Interactions in Aquatic Systems” *Poster* presented at the 227th American Chemical Society National Meeting, Philadelphia, Pennsylvania, August 2004

de Kerchove, A. J. and Elimelech, M. “Application of Electrokinetic Theory for Soft Particles to Bacterial Cells” presented at the American Chemical Society 78th Colloid and Surface Science Symposium, **Yale University**, New Haven, Connecticut, June 2004

de Kerchove, A. J. and Elimelech, M. “Relevance of the Soft Particle Outer-Surface Potential to Bacterial-Surface Interactions in Aquatic Systems” presented at the American Chemical Society 78th Colloid and Surface Science Symposium, **Yale University**, New Haven, Connecticut, June 2004

Zheng H., de Kerchove A., Hawes C. and Moore I. “Use of GFP to assay membrane traffic in wild-type and mutant *Arabidopsis*” presented in Society for Experimental Biology Symposium: “Membrane Trafficking in Plants”, University of Glasgow, 23-26 August 2003

Genard B., de Kerchove A., Bailey D.M., Priede I.G. and Rees J.-F. “Usual scaling of metabolic enzymes in white muscle of the eel *Synaphobranchus kaupii*” presented in 10th Deep-Sea Biology Symposium, Coos Bay, University of Oregon, OR, 25-29 August 2003

Genard B., de Kerchove A., Bailey D.M., Dupont S., Collins M.A., Priede I.G. and Rees J.-F. “Seasonal, Ontogenical, and depth-dependent variations in metabolic enzymes and protein in muscles of deep-sea demersal fish” presented in 10th Deep-Sea Biology Symposium, Coos Bay, University of Oregon, OR, 25-29 August 2003

de Kerchove A., Genard B., Collins M.A., Priede I.G. and Rees J.-F. “Muscles metabolic enzymes and swimming speeds in *Antimora rostrata* and *Coryphaenoides (N.) aramtus*, two deep-sea demersal fish” presented in 10th Deep-Sea Biology Symposium, Coos Bay, University of Oregon, OR, 25-29 August 2003

Research Experience

- 2002 – 2007 **Yale University** – New Haven, CT, USA
Research Engineer Dr. Menachem Elimelech
- *Conduct leading-edge research with direct applications to technological processes*
 - **Biofouling control:** Simulate bacterial deposition at solid-water interfaces and controlled predicted deposition kinetics by optical microscopy
 - **Microfilm design:** Developed polyelectrolyte multi-layer assembly techniques verified by quartz crystal microbalance (QCM) and atomic force microscopy (AFM)
 - *Participate in the organization and maintenance of laboratories for a research group (15 scientists)*
 - *Actively contribute to weekly work discussions aimed at troubleshooting problems and developing innovative ideas with fellow researchers*
- Spring 2005 **Research Engineer** Dr. Barbara Kazmierczak
- *Developed strong collaboration with Section of Infectious Disease, Yale University School of Medicine*
 - *Designed genetically modified microorganism by allelic exchange*
- 2001 – 2002 **Oxford University, Plant Sciences Department** – Oxford, United Kingdom
Research Engineer Dr. Ian Moore
- *Developed collaborative work between Oxford University (UK) and Catholic University of Louvain (BE)*
 - *Conducted research on the intracellular secretory pathway of proteins in plants*
 - *Defined membrane traffic defects in cells by confocal laser scanning microscopy (CLSM)*
 - *Controlled protein expression through implementation of molecular biology techniques*

Catholic University of Louvain – Louvain-la-Neuve, Belgium

2000 – 2001

Research Engineer

Dr. Jean-François Rees

- *Participated on research cruises in the North Atlantic as a guest of Ocean Laboratory, Aberdeen, UK*
- *Acted as the project leader for research investigating the metabolism of deep sea organisms*
 - *Actively trained undergraduate level student*
 - *Defined and assigned individual tasks, organized work schedule with ship crew*
 - *Managed international transport of material and organic samples*
- *Developed methods of enzyme extraction and designed protocols for enzyme activity measurement by visible and fluorescent spectrometry at low temperature*

Hawaii University – Honolulu, HI, USA

July 1999

Research Assistant

- *Assisted with research on the intelligence and rational behavior of bottlenosed dolphin*
- *Analyzed data on migratory timing of humpback whales in the central North Pacific*

Teaching Experience and Academic Services

Spring 2006

Teaching Fellow Position – Aquatic Chemistry

Dr. Gaboury Benoit

- *Advised 16 undergraduate- and graduate-level students*
- *Directed weekly discussion sessions, graded homework and final test*
- *Prepared course material*

Fall 2006

Teaching Fellow Position – Environmental Transport Processes

Dr. Menachem Elimelech

- *Directed weekly discussion sessions, graded homework, and advised 9 graduate-level students*
- *Prepared course material*
- *Substitute lecturer*

Fall 2005

Planning Committee Member of Robert M. Langer Graduate Symposium – Chemical Engineering Dept.

- *Planned graduate symposium with 3 committee members — budget of \$10,000.00 (60 participants)*

Awards and Honors

2006

ACS - Environmental Chemistry Graduate Student Award

2002 – 2003

Yale University Graduate Fellowship

2002 – 2003

Yale University Becton Scholarship

1999 – 2000

Erasmus Fellowship (European Union) – Aberdeen University (Scotland, UK)

Languages and Computer Skills

French

Mother tongue

English

Bilingual

Dutch

Basic

Computer skills

Operating Systems: Windows 95/98/NT/XP, MacOS

Applications: MATLAB, FEMLAB, MS Office

Languages: Basic knowledge of HTML, Pascal, Visual Basic

Extracurricular activities

Hobbies

Oil and acrylic painting (2 years at the Art Academy of Forest– Brussels), dancing, beer brewing

Sports

Scuba diving (PADI Master Scuba Diver – 1998), skiing (advanced), sailing (advanced)

Personal Travels

Africa / North and South America / Asia / Australia / Europe

References

Dr. Menachem Elimelech

Chair of Chem. Eng. Dept, Yale University

menachem.elimelech@yale.edu

Dr. Ian Moore

Prof., Oxford University, UK

ian.moore@plants.ox.ac.uk

Dr. Barbara Kazmierczak

Prof., School of Medicine, Yale University

barbara.kazmierczak@yale.edu

Dr. Paul Van Tassel

Prof., Chem. Eng. Dept., Yale University

paul.vantassel@yale.edu

Dr. Jean-Francois Rees

Prof., Dept. Life-Sciences, Catholic University of Louvain, Belgium

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