

## Kevin J. Wilkinson

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### Academic

- *Institut national de la recherche scientifique - Eau, Université du Québec*. Ph.D. (Environmental chemistry). July 1993.

### Professional experience

- *University of Montreal, Dept. of Chemistry*, Montreal, Canada. Associate Professor. Nov. 2005- present.
- *University of Geneva, Analytical and Biophysical Environmental Chemistry*, Geneva, Switzerland. Senior lecturer (*Maître d'enseignement et de recherche*). June 1997- Nov. 2005.
- *University of Geneva, Analytical and Biophysical Environmental Chemistry*, Geneva, Switzerland. Lecturer (*Maître-assistant*). October 1994- June 1997.

### Research focus

My research interests lie in the field of “molecular” environmental chemistry. Current projects are examining the nature of the physicochemical processes influencing trace metal bioaccumulation by microorganisms, especially with respect to biosensor development. We are attempting to relate the chemical speciation of trace metals in the environment and their bioavailability. The ability of microorganisms to modify their external medium, especially with respect to the production of biopolymers and the influence of the biopolymers on environmental processes, including flocculation are also of great interest. Single molecule detection techniques are being optimized and used to characterize biopolymers and colloids.

### Recognition by peers

- Member of editorial board of *Environmental Toxicology and Chemistry* (2004-2006)
- Member of editorial board of *Environmental Chemistry* (2004- )
- Titular member of the IUPAC Committee on Chemistry and the Environment (Division VI) (2006-2009)
- Editor (with J.R. Lead) of *Environmental Colloids: behaviour, structure and characterisation* (Wiley, 2006)
- Editor (with N. Senesi) of *Fractal Structures and Processes in Environmental Systems* (Wiley, 2007).

### Current research grants

- April 2006- March 2009. National Science and Engineering Research Council of Canada. Molecular insights into determinations of bioavailable metals in surface waters and biofilms.
- April 2006. National Science and Engineering Research Council of Canada. Trace metal determinations in heterogeneous systems using atomic absorption spectroscopy.
- February 2006. Canadian Foundation for Innovation. Quantifying diffusion coefficients in heterogeneous (environmental and biological) systems.
- October 2005- September 2008. European Commission. Dynamic sensing of chemical pollution disasters and predictive modeling of their spread and ecological impact.
- October 2005- September 2006. Cost guide for implementation of the UNECE protocol on pollutant release and transfer registers.
- October 2003- September 2006. Swiss National Funds. Molecular insights into the chemistry of trace metal uptake by microorganisms.

### **Selected invited conferences (since 2003)**

- Wilkinson, K.J. Bioavailability of trace elements to microorganisms: when does the physicochemistry limit the biological uptake. Clarkson University. Dept. of Biology. Feb. 17, 2006.
- Wilkinson, K.J. Bioavailability and biouptake by microorganisms: thermodynamic, dynamic or biological control? European Science Foundation Conference. Lausanne, Switzerland. October 14, 2005.
- Wilkinson, K.J. Is metal biouptake a steady-state process? Society of environmental toxicology and chemistry (SETAC) Europe, Lilles, France. May 21, 2005.
- Wilkinson, K.J. Bioaccumulation of trace metals. When does chemistry limit biological uptake? University of Lausanne. Dept. of Biology. Lausanne, Switzerland. Jan. 12, 2005.
- Wilkinson, K.J. Characterisation of biomacromolecules and environmental colloids. Towards single molecule detection. University of Montreal. Montreal, Canada. Sept. 2004.
- Wilkinson, K.J. Determining trace metal bioavailability to microorganisms. Griffiths University, Gold Coast, Australia. July 9, 2004.
- Wilkinson, K.J. Relating the chemical speciation of trace metals to their bioavailability: when are complexes bioavailable. Interact 2004. Gold Coast, Australia. July 4-8, 2004.
- Wilkinson, K.J.. The dynamic nature of environmental colloids and particles. The third international conference "Interfaces against pollution". Julich, Germany. May 24-27, 2004.
- Wilkinson, K.J. Chemical, physical and biological factors determining trace element bioavailability. Queens' University. Kingston, Canada. Nov. 27, 2003.
- Wilkinson, K.J. Relating the chemical speciation of trace metals to their bioavailability: chemical, physical and biological effects. University of Calgary. Calgary, Canada. Oct. 27, 2003.
- Wilkinson, K.J. and A. Reinhardt. Contrasting roles of natural organic matter on coagulation and flocculation processes in freshwaters. Workshop on Flocculation in Natural and Engineered Systems. Canadian Center for Inland Waters. Burlington, Canada. Sept. 2003.
- Wilkinson, K.J. Single colloid detection techniques: microscopic (AFM, TEM, FCS) based observations of environmental colloids. Third conference of the *in situ* particles network. University of Birmingham. Great Britain. March 2003.
- Wilkinson, K.J. Analytical characterization of dynamic suspensions of environmental colloids. Engler-Bunte-Institute water colloquium. University of Karlsruhe, Germany. Feb. 2003.

### **Organisation of conferences/ courses**

- The impact of global environmental problems on continental and coastal marine waters, July 16-18, 2003, Geneva, Switzerland, Local organizing committee.
- Postgraduate course on chemical speciation and bioavailability, Feb. 2004, Geneva, Switzerland. Local organizing committee.
- Interfaces against pollution, June 4-7, 2006, Granada, Spain, Scientific advisory committee.
- 7<sup>th</sup> workshop on Biosensors and bioanalytical microtechniques in environmental and clinical analysis. Kusadasi, Turkey, Sept. 10-14, 2006, Scientific advisory committee.
- North American annual SETAC meeting. Montreal, Canada, Nov. 5-9, 2006. Local organizing committee.

### **Teaching responsibilities**

- Introduction to environmental chemistry, Undergraduate (year 3).
- Environmental chemistry for non-chemists, Undergraduate (year 2).
- Previously taught: Analytical chemistry for pharmacists, Undergraduate (year 1); Analytical chemistry. Undergraduate (year 3); Limnology field course, Graduate; Bioavailability lab course, Graduate

### **Membership in professional societies**

- American chemical society (ACS)
- Society of environmental toxicology and chemistry (SETAC)
- American society of limnology and oceanography (ASLO)
- International union of pure and applied chemistry (IUPAC)

### **Selected peer-reviewed publication list (since 2000)**

18. Lead, J.R. and K.J. Wilkinson. 2006. Aquatic colloids and nanoparticles: current knowledge and future trends. *Env. Chem.* 3: 159-171 (Invited review)
19. Lamelas, C., Benedetti, M., Wilkinson, K.J. and V.I. Slaveykova. 2006. Characterization of H<sup>+</sup> and Cd<sup>2+</sup> binding properties of bacterial exopolymers. In press: *Chemosphere*.
20. Worms, I., Simon, D., Hassler, C.I. and K.J. Wilkinson. 2006. Bioavailability of trace metals to aquatic microorganisms: Importance of chemical, biological and physical processes on biouptake. In press: *Biochimie*. (Invited review)
21. Bayen, S., I. Worms, N. Parthasarathy, K.J. Wilkinson and J. Buffle. 2006. Cadmium speciation and bioavailability using the permeation liquid membrane. In press: *Analytica Chimica Acta*.
22. Duval, J., V.I. Slaveykova, M. Hosse, J. Buffle and K.J. Wilkinson. 2006. Electrohydrodynamic properties of succinoglycan as probed by fluorescence correlation spectroscopy, protolytic titration and capillary electrophoresis. In press: *Biomacromolecules*.
23. Balnois, E., G. Papastavrou and K.J. Wilkinson. 2006. Force microscopy and force measurements of environmental colloids. In press: Vol. 10 in the IUPAC series on Analytical and Physical Chemistry of Environmental Systems. Environmental colloids: behaviour, structure and characterisation, K.J. Wilkinson and J.R. Lead (eds.).
24. Lead, J.R. and K.J. Wilkinson. 2006. The characterisation of environmental colloids: what information is still required? In press: Vol. 10 in the IUPAC series on Analytical and Physical Chemistry of Environmental Systems. Environmental colloids: behaviour, structure and characterisation, K.J. Wilkinson and J.R. Lead (eds.).
25. Slaveykova, V.I. and K.J. Wilkinson. 2005. Predicting the bioavailability of metals and metal complexes: Critical review of the biotic ligand model. *Environ. Chem.* 2, 9-24.
26. Hassler, C.S., R. Behra and K.J. Wilkinson. 2005. Impact of zinc acclimation on bioaccumulation and homeostasis in *Chlorella kesslerii*. *Aquat. Toxicol.* 74: 139-149.
27. Kola, H. and K.J. Wilkinson. 2005. Cadmium uptake by a green alga can be predicted by equilibrium modeling. *Environ. Sci. Technol.* 39: 3040-3047.
28. Lamelas, C., K.J. Wilkinson and V.I. Slaveykova. 2005. Influence of the composition of natural organic matter on Pb bioavailability to microalgae. *Environ. Sci. Technol.* 39: 6109-6116.
29. Duval, J., K.J. Wilkinson, J. Buffle and H.P. van Leeuwen. 2005. Humic substances are soft and permeable spheres: evidence from their electrophoretic mobilities. *Environ. Sci. Technol.* 39: 6435-6445.
30. Lamelas, C., F. Avaltroni, M. Benedetti, K.J. Wilkinson and V.I. Slaveykova. 2005. Linking the trace metal binding of alginic acid to its conformation. *Biomacromolecules*. 6: 2756-2764.
31. Wilkinson, K.J. and A. Reinhardt. 2005. Contrasting roles of natural organic matter on colloidal stabilization and flocculation in freshwaters. In: Flocculation in natural and engineered environmental systems. I.G. Droppo, G. G. Leppard, S.N. Liss, T. Milligan (eds.). Ch. 7, pp. 143-170.
32. Hassler, C.S., Slaveykova, V.I. and K.J. Wilkinson. 2004. Some fundamental (and often overlooked) considerations underlying the free ion activity and biotic ligand models. *Environ. Toxicol. Chem.* 23: 283-291.
33. Slaveykova, V.I., Parthasarthy, N., Buffle, J. and K.J. Wilkinson. 2004. Permeation liquid membrane as a tool for the monitoring of bioavailable Pb in natural waters. *Sci. Total Environ.* 328: 55-68.
34. Hassler, C.S., Slaveykova, V.I. and K.J. Wilkinson. 2004. Discriminating between intra- and extracellular metals using chemical extractions. *Limnol. Oceanogr. Methods*. 2: 237-247.
35. Kola, H., L.M. Laglera, N. Parthasarathy and K.J. Wilkinson. 2004. Cadmium adsorption by *Chlamydomonas reinhardtii* and its interaction with the cell wall proteins. *Environ. Chem.* 1: 172-179.
36. Wilkinson, K.J. and J. Buffle. 2004. Critical evaluation of physicochemical parameters and processes for modeling the biological uptake of trace metals in environmental (aquatic) systems. In: Physicochemical Kinetics and Transport at Chemical - Biological Interphases, H.P. van Leeuwen, W. Koester (eds.), Wiley, Chichester. Ch. 10, pp. 445-533.
37. Hassler, C.S. and K.J. Wilkinson. 2003. Failure of the biotic ligand and free-ion activity models to explain zinc bioaccumulation by *Chlorella kesslerii*. *Environ. Toxicol. Chem.* 22: 620-626.
38. Slaveykova, V.I., K.J. Wilkinson, A. Ceresa and E. Pretsch. 2003. Role of fulvic acid on lead bioaccumulation to *Chlorella kesslerii*. *Environ. Sci. Technol.* 37: 1114-1121.
39. Smiejan, A., K.J. Wilkinson and C. Rossier. 2003. Cd bioaccumulation by a freshwater bacterium (*Rhodospirillum rubrum*). *Environ. Sci. Technol.* 37: 701-706.

40. Lead, J.R., K. Starchev and K.J. Wilkinson. 2003. Diffusion coefficients of humic substances in water and thorough agarose gel. *Environ. Sci. Technol.* 37: 482-487.
41. Slaveykova, V.I. and K.J. Wilkinson. 2003. Effect of pH on Pb uptake by the freshwater alga, *Chlorella kesslerii*. *Environ. Chem. Let.* 1: 185-189.
42. Slaveykova, V.I. and K.J. Wilkinson. 2002. Physicochemistry of Pb accumulation by *Chlorella vulgaris*. *Environ. Sci. Technol.* 36: 969-975.
43. Hosse, M. and K.J. Wilkinson. 2002. Response to comment on: Determination of electrophoretic mobilities and hydrodynamic radii of three humic substances as a function of pH and ionic strength. *Environ. Sci. Technol.* 36: 3043-3044.
44. Meunier, F. and K.J. Wilkinson. 2002. Non-perturbing fluorescent labeling of polysaccharides. *Biomacromolecules.* 3: 857-864.
45. Balnois, E. and K.J. Wilkinson. 2002. Sample preparation for the observation of environmental biopolymers by atomic force microscopy. *Colloids and Surfaces A: Physicochemical and Engineering Aspects.* 207: 229-242.
46. Avena, M. and K.J. Wilkinson. 2002. Disaggregation kinetics of a peat humic acid: mechanism and pH effects *Environ. Sci. Technol.* 36: 5100-5105.
47. Wilkinson, K.J., V.I. Slaveykova, C.S. Hassler and C. Rossier. 2002. Physicochemical mechanisms of trace metal bioaccumulation by microorganisms. *Chimia.* 56: 681-684.
48. Stoll, S., K. Starchev, K.J. Wilkinson, P. Chadanowski, E. Balnois, X. Leng and J. Buffle. 2001. The study of environmental biopolymers by mathematical modeling and single molecular detection techniques. *Chimia.* 55: 190-195.
49. Camensano, T. and K.J. Wilkinson. 2001. Single molecule study of xanthan conformations using atomic force microscopy. *Biomacromolecules.* 2: 1184-1191.
50. Hosse, M. and K.J. Wilkinson. 2001. Determination of electrophoretic mobilities and hydrodynamic radii of three humic substances as a function of pH and ionic strength. *Environ. Sci. Technol.* 35: 4301-4306.
51. Das, G.; L. Ouali, M. Adrian, B. Baumeister, K.J. Wilkinson and S. Matile. 2001.  $\beta$ -fibrillogenesis from rigid-rod  $\beta$ -barrels: Hierarchical preorganization beyond microns. *Angew. Chem. Int. Ed.* 40: 4657-4661.
52. Starchev, K., K.J. Wilkinson, and J. Buffle. 2001. Application of FCS to the study of environmental systems. *Fluorescence Correlation Spectroscopy. Theory and Applications.* R. Rigler and E.L. Elson (eds.), Springer Publishers. Ch. 12, pp. 251-275.
53. Mirimanoff, N. and K.J. Wilkinson. 2000. Regulation of Zn accumulation by a freshwater Gram-positive bacterium (*Rhodococcus opacus*). *Environ. Sci. Technol.* 34: 616-622.
54. Lead, J., K.J. Wilkinson, K. Starchev, S. Canonica and J. Buffle. 2000. Diffusion coefficients of humic substances as determined by fluorescence correlation spectroscopy: Role of solution conditions. *Environ. Sci. Technol.* 34: 1365-1369.
55. Buykx, S.E.J., M.A.G.T. van den Hoop, R.F.M.J. Cleven, J. Buffle and K.J. Wilkinson. 2000. Particles in natural surface waters: Chemical composition and size distribution. *Intern. J. Environ. Anal. Chem.* 77: 75-93.
56. Wilkinson, K.J. and F. Cuenod. 2000. Optimization of the hydrolysis of freshwater polysaccharides. *Intern. J. Environ. Anal. Chem.* 77: 323-335.
57. Lead, J., K.J. Wilkinson, E. Balnois, C. Larive, B. Cutak, S. Assemi and R. Beckett. 2000. Diffusion coefficients and polydispersities of the Suwannee River Fulvic acid. Comparison of fluorescence correlation spectroscopy, nuclear magnetic resonance, flow field-flow fractionation and atomic force microscopy. *Environ. Sci. Technol.* 34: 3508-3513.
58. Balnois, E., S. Stoll, K.J. Wilkinson, J. Buffle, M. Rinaudo and M. Milas. 2000. Conformational transformations of succinoglycan as observed by atomic force microscopy. *Macromolecules.* 33: 7440-7447.