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Personal: Born: St. Petersburg, Florida, October 30, 1955.

Positions: Professor of Chemistry, University of Massachusetts Lowell, 9/97 - present.  
Associate Professor of Chemistry, University of Massachusetts Lowell, 9/93 - 9/97.  
Assistant Professor of Chemistry, University of Massachusetts Lowell, 8/89-8/93.  
Associate Scientist, Edgerton Research Laboratory, New England Aquarium, 3/82-8/89.

Education: Ph.D. in Chemistry, University of New Hampshire, Durham, New Hampshire, 1983.

Dissertation Work: The analytical and inorganic chemistry of naturally occurring organic matter complexes of trace metals.

B.S. in Chemistry, Le Moyne College, Syracuse, New York, 1977.

Awards: New York State Regents Scholarship for full undergraduate career, 1973-1977.  
IPH Research Fellowship, Interdisciplinary Programs in Health, Harvard Univ, 1983-1985.  
Donner Research Fellowship, Environmental Sciences Program, UMass Boston, 7/88-8/89.  
UMass Lowell, Department of Chemistry, Teaching Excellence Award, 1998-1999.

Professional Affiliations: The American Chemical Society  
Division of Analytical Chemistry  
Division of Environmental Chemistry

Grants & Contracts: 1/84 - 4/85: Principal Investigator; Springborn Bionomics Contract; \$5,000  
3/85 - 3/86: Co-Investigator; South Essex Sewerage District/ Camp Dresser & McKee Subcontract; \$24,879  
7/86-10/86: Co-Principal Investigator (with W.E. Robinson); South Essex Sewerage District/CDM Subcontract; \$119,931  
7/86 - 6/89: Principal Investigator; U.S. EPA Office of Research and Development Grant; \$183,191  
1986: Co-author (with P.J. Boyle); Digital Equipment Corporation Equipment Grant; \$250,000  
6/87 - 5/90: Co-principal Investigator (with W.E. Robinson); Mass Water Resources Authority/CDM Subcontract; \$309,914

1987: Coauthor (with A.J. Barker); Orion Research, Inc. Equipment Grant; \$9,000  
1987: Coauthor (with P.J. Boyle); EG&G Princeton Applied Research Equipment Grant; \$19,470  
1987: Principal Investigator; U.S. DOE Used Energy-Related Lab Equipment Grant; \$98,765  
1988: Principal Investigator; Groton Technology, Inc. Equipment Grant; \$10,100  
1989: Co-Principal Investigator (with I. Olmez); Massachusetts Bays Program Research Grant; \$20,000  
1990: Co-Principal Investigator (with T. Ford); Government of Mexico Research Grant; \$48,263  
1991: Principal Investigator; Caribbean Conservation Corps. Grant; \$13,500  
7/91 - 6/94: Principal Investigator (with C.J. Bruell); U.S.G.S./Water Resources Research Center Grant; \$58,045.  
11/91 - 11/93: Co-Principal Investigator (with D. Golomb & N. Eby) Massachusetts Bays Program Grant; \$150,000.  
7/94 - 6/96: Co-Principal Investigator (with C.J. Bruell); U.S.G.S./Water Resources Research Center Grant; \$25,000.  
7/93 - 9/94: Principal Investigator (with K. Marx); U.S. Army Research Office Grant; \$38,257.  
9/93 - 1/94: Principal Investigator (with G.N. Eby); Massachusetts Health Research Institute Grant; \$1,000.  
8/95 - 6/96: Co-Investigator (with D.Wegman, L.Punnett, S.Woskie, B.Buchholz, L.Silka) Boston Area Heavy & Highway Construction Workers Health & Safety Project; \$464,700.  
2/96 - 5/96: Co-Principal Investigator (with C.J. Bruell); Hampshire Chemical Company Contract; \$2,832.  
3/96 - 3/98: Co-Investigator (with W. Bannister); Federal Aviation Administration Grant; \$256,672.  
12/96 - 8/98: Principal Investigator; Massachusetts Bays Program Grant; \$10,000.  
8/99 - 7/00: Principal Investigator, Axion Associates Grant; \$10,225.  
9/02 - 9/03: Principal Investigator, Massachusetts Department of Environmental Protection Contract, \$40,204.  
12/02 - 12/03: Principal Investigator, Duke Energy Grant, \$47,369.  
2/05 - 8/05: Principal Investigator, Konarka Technologies, \$8,316.29  
9/02 - 3/08: Co-Principal Investigator (with D. Golomb & E. Barry) Department of Energy Cooperative Agreement, \$750,000.  
9/06 - 12/07: Principal Investigator (with D. Golomb), Massachusetts Technology Transfer Center, \$25,000.00  
12/07 – 5/09: Principal Investigator, Bausch & Lomb Grant, \$50,189.00

#### Papers:

Ryan, D.K. and Weber, J.H. (1982) A fluorescence quenching titration technique for the determination of complexing capacities and stability constants of fulvic acid. *Anal. Chem.* 53, 969-973.

Ryan, D.K. and Weber, J.H. (1982) Copper(II) complexing capacities of natural water by fluorescence quenching. *Environ. Sci. Technol.* 16, 866-872.

Ryan, D.K., Thompson, C.P. and Weber, J.H. (1983) Comparison of  $Mn^{2+}$ ,  $Co^{2+}$  and  $Cu^{2+}$

- binding to fulvic acid as measured by fluorescence quenching. *Can. J. Chem.* 61, 1505-1509.
- Ryan, D.K. and Weber, J.H. (1985) Comparison of chelating agents immobilized on glass with Chelex-100 for trace metal preconcentration. *Talanta* 32, 859-863.
- Robinson, W.E. and Ryan, D.K. (1986) Metal interactions within the kidney, gill and digestive gland of the quahog, *Mercenaria*, following laboratory exposure to cadmium. *Arch. Environ. Contam. Toxicol.* 15, 23-30.
- Robinson, W.E. and Ryan, D.K. (1988) Transport of cadmium and other metals in the blood of the bivalve mollusc *Mercenaria*. *Mar. Biol.* 97, 101-109.
- Ryan, D.K. and Ventry, L.S. (1990) Comments on fluorescence quenching measurements of copper-fulvic acid binding. *Anal. Chem.* 62, 1523-1526.
- Ventry, L.S., Ryan, D.K. and Gilbert, T.R. (1991) A rapid fluorescence quenching method for the determination of equilibrium parameters for copper(II) complexation by humic materials. *Microchem. J.* 44, 201-214.
- Robinson, W.E., Ryan, D.K. and Wallace, G.T. (1993) Gut contents: A significant contaminant of *Mytilus edulis* whole body metal concentrations. *Arch. Environ. Contam. Toxicol.* 25, 415-421.
- Duggan, J.W., Bruell, C.J. and Ryan, D.K. (1994) *In situ* emulsification and mobilization of gasoline range hydrocarbons using surfactants. *J. Soil Contamination* 3, 159-182.
- Ford, T. and Ryan, D.K. (1995) Toxic metals in aquatic ecosystems: A microbiological perspective. *Environ. Health Perspectives* 103(Supl 1), 25-28.
- Ryan, D.K., Shia, C.P. and O'Conner, D.V. (1996) Fluorescence spectroscopic studies of Al-fulvic acid complexation in acidic solutions. In *Humic and Fulvic Acids: Isolation, Structure, and Environmental Role*, J.J. Gaffney, N.A. Marley and S.B. Clark, eds., ACS Symposium Series 651, American Chemical Society, Washington, DC., Chapter 9, pp. 125-139.
- Hays, M.D., Ryan, D.K., Pennell, S. and Ventry-Milenkovic, L. (1996) Data treatments for relating metal-ion binding to fulvic acid as measured by fluorescence spectroscopy. In *Humic and Fulvic Acids: Isolation, Structure, and Environmental Role*, J.J. Gaffney, N.A. Marley and S.B. Clark, eds., ACS Symposium Series 651, American Chemical Society, Washington, DC., Chapter 8, pp. 108-124.
- Butler, G.C. and Ryan, D.K. (1996) Investigation of fulvic acid-Cu<sup>2+</sup> complexation by ion-pair reversed-phase high-performance liquid chromatography with post-column fluorescence quenching titration. In *Humic and Fulvic Acids: Isolation, Structure, and Environmental Role*, J.J. Gaffney, N.A. Marley and S.B. Clark, eds., ACS Symposium Series 651, American Chemical Society, Washington, DC, Chapter 10, pp. 140-150.
- Robinson, W.E., Ryan, D.K., Sullivan, P.A. and Boggs, C.C. (1996) Cadmium transport in the blood plasma of two marine bivalves. *Environ. Toxicol. Chem.* 16(6), 1195-1202 (1997).
- Liu, X and Ryan, D.K. (1997) Analysis of fulvic acids using HPLC/UV coupled to FT-IR Spectroscopy. *Environmental Technology* 18, 417-424.

- Golomb, D., Ryan, D., Eby, G.N., Underhill, J. and Zemba, S. (1997) Atmospheric deposition of toxics onto Massachusetts Bay: I. Metals. *Atmospheric Environment* 31(9), 1349-1359.
- Golomb, D., Ryan, D., Underhill, J., Wade, T. and Zemba, S. (1997) Atmospheric deposition of toxics onto Massachusetts Bay: II. Polycyclic aromatic hydrocarbons. *Atmospheric Environment* 31(9), 1361-1368.
- Crawford, S.C., Bruell, C.J., Ryan, D.K. and Duggan, J.W., (1997) "Effects of emulsion viscosity during surfactant enhanced soil flushing in porous media. *J. Soil Contamin.* 6(4), 355-370.
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- Bruell, C.J., Barker, C.C., Ryan, D.K. and Duggan, J.W. (1998) Surfactant enhanced flushing of unsaturated porous media. *J. Soil Contam.* 7(1), 47-71.
- Bruell, C.J., Ryan, D.K., Barker, C.C., and Lazzaro, J. (1997) Laboratory Evaluation of a Biodegradable Surfactant for In Situ Soil Flushing. *J. Soil Contam.* 6(5), 509-523.
- Shine, J., Ford, T. and Ryan, D.K. (1998) Annual cycle of heavy metals in a tropical lake-Lake Chapala, Mexico. *J. Environ. Sci. Health* A33, 23-43.
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- Coolidge, C.L. and Ryan, D.K. (2000) Binding of Organic Nitrogen Compounds to Soil Fulvic Acid as Measured by Molecular Fluorescence Spectroscopy, in "Humic Substances Versatile Components of Plants, Soil and Water", E.A. Ghabbour and G. Davies , Eds., Royal Society of Chemistry, Cambridge, p. 205-214.
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- Lee, N.C.Y. and Ryan, D.K. (2003) An  $^{27}\text{Al}$  Solution NMR Study of Fulvic Acid - Aluminum (III) Complexation, in "Humic Substances: Nature's Most Versatile Materials", E.A. Ghabbour and G. Davies , Eds., Taylor and Francis, Inc., NY, in press.
- Hays, M.D., Ryan, D.K. and Pennell, S. (2004) A Modified Multisite Stern-Volmer Equation for the Determination of Conditional Stability Constants and Ligand Concentrations of Soil Fulvic Acid with Metal Ions. *Anal. Chem.*, 76(3), 848-854.
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- Golomb, D., Barry, E., Ryan, D., Lawton, C. and Swett, P. (2004) Limestone-Particle-Stabilized Macroemulsion of Liquid and Supercritical Carbon Dioxide in Water for Ocean Sequestration. *Environ. Sci. Technol.*, 38(16), 4445-4450.

Lee, N.C.Y., Ryan, D.K. and Rajesh, Geetha (2005) Quantitative Analysis of Aluminum and Soil Fulvic Acid Complexes by Solution State Aluminum-27 Nuclear Magnetic Resonance Spectroscopy. In: Humic Substances: Molecular Details and Applications in Land and Water Conservation, Ghabbour E. and Davies G (eds.), Taylor & Francis, p.199-209.

Avanadula, R.M. and Ryan D.K. (2005) Measurement of Free Metal Ion in Equilibrium with Humic-Metal Complexes Using NMR Solvent Suppression Technique. In: Humic Substances: Molecular Details and Applications in Land and Water Conservation, Ghabbour E and Davies G (eds.), Taylor & Francis, p. 189-198.

Golomb, D., Barry, E., Ryan, D., Swett, P. and Duan, H. (2006) Macroemulsion of Liquid and Supercritical CO<sub>2</sub>-in-Water and Water-in-Liquid CO<sub>2</sub> Stabilized by Fine Particles. Ind. Eng. Chem. Res. 45, 2728-2733.

Liang, C., Bruell, C.J., Albert, M.F., Cross, P.E. and Ryan, D.K. (2007) Evaluation of Reverse Osmosis and Nanofiltration for *In Situ* Persulfate Remediated Groundwater. Desalination, 208, 238-259.

Golomb, D., Pennell, S., Ryan, D., Barry, E., and Swett, P. (2007) Ocean Sequestration of Carbon Dioxide: Modeling the Deep Ocean Release of a Dense Emulsion of Liquid CO<sub>2</sub>-in-Water Stabilized by Pulverized Limestone Particles. Environ. Sci. Technol., 41, 4698-4704

Sharma, S.K., Tyagi, R., Kumar, S., Kumar, R., Barry, E.F., Kumar, J., Watterson, A.C., Ryan, D.K., Parmar, V. (2008) Selective recognition of Ca<sup>2+</sup> ions using novel polymeric phenols. Microchem. J. 90, 89-92.