

DAVID K. RYAN
Department of Chemistry
University of Massachusetts Lowell
One University Avenue
Lowell, MA 01854
(978) 934-3698 phone
(978) 934-3013 fax
David_Ryan@uml.edu
http://faculty.uml.edu/David_Ryan

- Positions: Chair, Department of Chemistry, University of Massachusetts Lowell, 9/16 - present.
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
- Manuscript Review: Environmental Science and Technology, Microchemical Journal, Soil and Sediment Contamination, Aquatic Sciences, Journal of Inorganic Biochemistry, Spectroscopy Part A., Analytical and Bioanalytical Chemistry, The Analyst, International Journal of Environmental Analytical Chemistry, Chemosphere, Journal of Polymers and the Environment, Journal of Photochemistry & Photobiology
- Proposal Review: Water Resources Research Center, U.S. Geological Survey
National Science Foundation, Division of Chemistry
- Book review: Brooks/Cole Thompson Learning, John Wiley & Sons, Wiley-VCH Verlag GmbH & Co., Elsevier Science and Technology Books
- Consulting: Bausch&Lomb, Rochester, NY; Beckman Coulter, Miami, FL; FRX Polymers, Chelmsford, MA; Integra Bioscience Corp., Hudson, NH; Allegheny Consulting Group, Tyngsboro, MA; Vista Scientific, Lowell, MA; Pulpdent, Watertown, MA; Bester Innovations, LLC, Billerica, MA; Matrix Technologies, Hudson, NH; Nucryst Pharmaceuticals, Wakefield, MA; Recycline, Inc., Waltham, MA; Vista Scientific, Lowell, MA; Zeptometrics, Franklin, MA; Kronos, Lowell, MA.
- 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 PI 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 PI 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 PI I. Olmez); Massachusetts Bays Program Research Grant; \$20,000
1990: Co-Principal Investigator (with PI 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 PI D. Golomb & N. Eby) Massachusetts Bays Program Grant; \$150,000.
7/94 - 6/96: Co-Principal Investigator (with PI 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 PI 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 PI C.J. Bruell); Hampshire Chemical Company Contract; \$2,832.
3/96 - 3/98: Co-Investigator (PI W. Bannister) Fed. Aviation Admin. 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 PI 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.
12/07 - 12/09: Principal Investigator, Bausch & Lomb Grant, \$50,189.
1/10 - 3/11: Principal Investigator, Department of Energy Cooperative Agreement, \$572,000.
8/12 - 7/17: Co-Principal Investigator (with PI M. Shen and M. Ruths), National Science Foundation Grant, \$416,541.
4/17 - 8/18: Investigator (with PI M. Sobkowicz-Kline), Estee Lauder Contract, \$148,936.
9/15 - 2/21: Co-Principal Investigator (with PI P. Kurup and R. Nagarajan), National Science Foundation Grant, \$376,625.
4/18 - 4/19: PI, Mass Clean Energy Center Grant, \$25,000.
8/1/19 - 7/31/20: Principal Investigator, Amorphex Therapeutics Contract, \$7,100.
8/1/19 - 7/31/20: Principal Investigator, Optowares Contract, \$10,420.
7/1/19 - 8/1/20: Co-PI (with Kwok-Fan Chow), Vuronyx Technologies Contract, \$2,500.
8/1/20 - 7/31/21: Principal Investigator, Mass Clean Energy Center Grant, \$65,000.
9/1/20 - 8/31/23: Co-PI (with Michael Ross), Stony Brook/ONR, \$379,505.
9/1/21 - 8/31/23: Principal Investigator, Mass Clean Energy Center Grant, \$25,000
10/1/21 - 9/30/23: Principal Investigator, Stony Brook/ONR, \$290,000.
1/1/23-12/31/23: Co-PI (with Michael B. Ross), Stony Brook/ONR, \$505,000.

Papers & Patents:

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 Mn²⁺, Co²⁺ and Cu²⁺ 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-Cu²⁺ 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.

Coletta, T.F., Bruell, C.J., Ryan, D.K. and Inyang, H.I. (1997) Cation-enhanced solutions for the electrokinetic removal of Pb from kaolinite. *ASCE J. Environ. Eng.* 123(12), 1227-1233.

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.

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.

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.

Ryan, D.K. (2000) Liquid Chromatography: Humic Substances, in *Encyclopedia of Separation Science*, Academic Press, London, p. 3032-3039.

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.

Hays, M.D., Ryan, D.K., and Pennell, S. (2003) A Multi-Wavelength Fluorescence-Quenching Model for Determination of Cu²⁺ Conditional Stability Constants and Ligand Concentrations of Fulvic Acid. *Appl. Spectros.* 57(4), 454-460.

Lee, N.C.Y. and Ryan, D.K. (2003) An ²⁷Al 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.

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.

C.Y. Hsieh, M.H. Tsai, D.K. Ryan, O.C. Pancorbo (2004) Toxicity of the 13 Priority Pollutant Metals to Vibrio Fisheri in the Microtox Chronic Toxicity Test. *Sci. Total Environ.* 320, 37-50.

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) Macroemulsions of Liquid and Supercritical CO₂-in-Water and Water-in-Liquid CO₂ 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 CO₂-in-Water Stabilized by Pulverized Limestone Particles. *Environ. Sci. Technol.*, 41, 4698-4704.

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- Ryan, David K., Golomb, Dan S., Barry, Eugene F., Woods, Michael J. and Swett, Peter A. (2010) Particle Stabilized Emulsions for Extraction of Hydrocarbons from Oil Sands and Oil Shale. U.S. Patent WO/2010/148204, December 23, 2010; PCT/US2010/038998.
- Ryan, David K., Bayala, Issa and Rogers, Eugene (2011) Reduction of α -tocopherol quinone., U.S. Patent, November 10, 2011; PCT/WO2011/139897
- Subramanian, G., Chaudhury, P., Malu, K., Fowler, S., Manmode, R., Gotur, D., Zwerger, M., Ryan, D., Roberti, R., Gaines, P., (2012) Lamin B Receptor Regulates the Growth and Maturation of Myeloid Progenitors via its Sterol Reductase Domain: Implications for Cholesterol Biosynthesis in Regulating Myelopoiesis. *J. Immunology* **188**, 85-102.
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<http://dx.doi.org/10.1016/B978-0-12-409547-2.04781-8>
- Zhu, Bingqi, Pennell, Stephen A. and Ryan, David K. (2014) Characterizing the Interaction between Uranyl Ion and Soil Fulvic Acid Using Parallel Factor Analysis and a Two-Site Fluorescence Quenching Model. *Microchemical J.* **115**, 51-57.
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- Dev, S., Shah, P., Zhang, Y., Ryan, D., Hansen, C., and Lee, Y. (2017) Synthesis and Mechanical Properties of Flame Retardant Vinyl Ester Resin for Structural Composites. *Polymer* **133**, 20-29.
- Ryan, D.K. and Jayamanna, M. (2018) Catalytic Hydrogen Production, U.S. Patent WO 2018/174452 A1, September 27, 2018, PCT/US2018/023380.
- Zhu, B. and Ryan, D.K. (2018) Principles and Applications in Nuclear Engineering: Radiation Effects, Thermal Hydraulics, Radionuclide Migration in the Environment. R.O.A. Rahman and H.E.-D.M. Saleh eds. InTech Open, London, England. ISBN: 978-1-78923-617-0, pp. 151-161.
- Lu, D., Liu, X., Apul, O.G., Zhang, L., Ryan, D.K., and Zhang, X. (2019) Optimization of Biomethane Production from Anaerobic Co-digestion of Microalgae and Septic Tank Sludge. *Biomass Bioenergy* **127**, 105266.
- Zhang, Y., Demokritou, P., Ryan, D.K. and Bello, D. (2019) Comprehensive Assessment of Short-Lived ROS and H₂O₂ in Laser Printer Emissions: Assessing the Relative Contribution of Metal Oxides and Organic Constituents. *Environ. Sci. Technol.* **53**(13), 7574-7583. <https://doi.org/10.1021/acs.est.8b05677>.
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Wang, C., Ren, H., Zeng, M., Zhu, Q., Zhang, Q., Kan, Z., Wang, Z., Shen, M., Acharige, M., Ruths, M., Ryan, D.K., Li, G., Kolesov, G., Kaxiras, E. and Mazur, E. (2020) Low-cost visible-light photosynthesis of water and adsorbed carbon dioxide into long-chain hydrocarbons. *Chem Phys Lett* 739,136985. <https://doi.org/10.1016/j.cplett.2019.136985>.

Shah, P.N., Acharige, M., Kim, N., Zhang, Y., Ryan, D.K., DeSisto, W. and Lee, Y. (2021) Green Bisphenol A: A High Valued Building Block Isolated from Lignin Biowaste. *Waste Biomass Valorization*. <https://doi.org/10.1007/s12649-020-01032-2>.

Zhang, Y., Bello, A., Ryan, D., Demokritou, P and Bello, D. (2022) Elevated urinary biomarkers of oxidative damage in photocopier operators following acute and chronic exposures. *Nanomaterials* 12(4), 715. <https://doi.org/10.3390/nano12040715>.

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Instructional Activities:

Analytical/Environmental Seminar Program: Over 200 Speakers 1990 to 2018

Courses Taught: Graduate Level

CHEM.6530 Chemical Oceanography
CHEM.5140 Advanced Analytical Chemistry
CHEM.5260 Chromatography
CHEM.5190 Environmental Chemistry
CHEM.6010/6020 Chemistry Seminar
CHEM.6030/6040 Chemistry Colloquium

Undergraduate Courses

CHEM.3130 Analytical Chemistry I
CHEM.3140 Analytical Chemistry II
CHEM.3150 Analytical Chemistry I Laboratory
CHEM.3160 Analytical Chemistry II Lab

Distance Learning:

Taught CHEM.6530 Chemical Oceanography in a distance learning format to UML, UMB, UMA & UMD students offered as a core course in the Intercampus Graduate School of Marine Science and Technology, 2003 -2018.

Engineering Review Course:

Taught Chemistry review class for undergraduate engineering students preparing for Fundamentals of Eng. Exam, 2010 - 2012.