



Curriculum Vitae

Paul C. DeLeo, Ph.D.

Integral Consulting, Inc.



OVERVIEW OF EXPERIENCE AND EXPERTISE

Dr. Paul DeLeo is a scientific professional whose focus over the past 24 years has included applied research and regulatory and public outreach related to the human and environmental safety of food ingredients, pesticides, pharmaceuticals, personal care products, and cleaning products. A strategic and visionary thinker, Dr. DeLeo successfully implements solutions from conception through rollout and broad stakeholder outreach. His professional interests span broad areas related to product stewardship and the sustainability of formulated consumer products and their ingredients. His work has been published widely in the peer-reviewed literature, and he has delivered dozens of oral and poster presentations at conferences for major scientific societies including the American Chemical Society, the Society of Toxicology, the Society of Environmental Toxicology and Chemistry, the International Society of Exposure Science, and the Society for Risk Analysis.

ACADEMIC HISTORY

Cornell University, College of Agriculture and Life Sciences, PhD, August 1996

Rensselaer Polytechnic Institute, MS Environmental Engineering, August 1992

Marquette, University, BS Mechanical Engineering, May 1988

PROFESSIONAL EXPERIENCE

Integral Consulting, Inc., Annapolis, MD

10/2017 – present

Principal

Leader of the company's initiative on product stewardship, directing company resources to address clients' challenges in the assessment and communication of the human and environmental safety of chemicals across their life cycle. For example:

- Developing and implementing strategies for high-throughput environmental risk assessment of cosmetic ingredients and fragrance materials
- Identifying and assessing precedents in regulatory science associated with EPA's implementation of 2016 reforms to the Toxic Substances Control Act
- Providing support to companies bringing new chemicals to market in the United States including of Per- and Polyfluoroalkyl Substances (PFAS)
- Leading the industry response to proposed regulations on over-the-counter (OTC) sunscreen drug products
- Assessing potential exposure of chemicals in consumer products for compliance with California's Proposition 65

American Cleaning Institute, Washington, DC

4/2007 – 10/2017

Associate Vice President, Environmental Safety (4/2014 – 10/2017)*Senior Director, Environmental Safety* (6/2010 – 3/2014)*Director, Environmental Safety* (4/2007 – 5/2010)

- Leader of the association's response to proposed regulations of topical antimicrobial products by the U.S. Food and Drug Administration. This included development of the economic benefits assessment that was used to successfully advocate in front of the U.S. White House Office of Management and Budget (OMB) to secure a deferral in rulemaking for ingredients critical to member companies' products and preserved the members' ability to continue to market their products.
- Conceived, developed and implemented the association's [Cleaning Product Ingredient Safety Initiative](#). We identified the inventory of chemicals used in consumer cleaning products in the U.S. (nearly 600) and made hazard and exposure data for each of them publicly available.
- Led eight work groups addressing a variety of issues confronting the association.
- Manage seven consultants and the associated \$500,000 research and regulatory budget.

U.S. Food and Drug Administration, College Park, MD

7/1999 – 4/2007

Consumer Safety Officer (4/2004 – 4/2007)

Responsible for guiding food and color additive petitions through the regulatory review process including providing guidance to individuals, typically from industry, seeking interpretation of the food and color additive regulations. Also conducted the review of the intended technical effect (microbiology) and environmental sections of food and color additive petitions.

Environmental Scientist (12/2000 – 4/2004)

Evaluated environmental submissions in food and color additive petitions and food contact notifications for compliance with the National Environmental Policy Act including the review of scientific data to determine the environmental impact of FDA-regulated chemicals.

Microbiologist (7/1999 – 12/2000)

Responsible for the critical evaluation and preparation of microbiology reviews of the sterility assurance portion of Abbreviated New Drug Applications (ANDAs) for injectable, ophthalmic and inhalation drugs.

Syracuse Research Corporation, Arlington, VA

10/1997 – 7/1999

Senior Environmental Scientist

Responsible for the critical evaluation of the validity and regulatory compliance of industry studies on the environmental fate of pesticides for the USEPA under FIFRA, and the preparation of data evaluation records; studies include laboratory hydrolysis, photolysis, mobility, metabolism, bioaccumulation and field dissipation.

Malcolm Pirnie, Inc., White Plains, NY

7/1996 – 10/1997

Environmental Engineer

Technical lead for design of remedial plan at various Federal facilities contaminated with hazardous wastes. Leader of development teams for bench-scale and pilot scale treatability studies for in-situ bioremediation of groundwater contaminated with petroleum and solvents.

SELECTED PUBLICATIONS

Mudge, S.M., S.E. Belanger, and **P.C. DeLeo**. 2019. Fatty alcohols: Anthropogenic and natural occurrence in the environment. 2nd Edition. Royal Society of Chemistry, London.

Zhen, W., D. Dihn, W.C. Scott, E.S. Williams, M. Ciarlo, **P.C. DeLeo**, and B.W. Brooks. 2019. Critical review and probabilistic health hazard assessment of cleaning product ingredients in all-purpose cleaners, dish care products, and laundry care products. *Environ. Int.* 125: 399–417.

DeLeo, P.C., M. Ciarlo, C. Pacelli, W. Greggs, E.S. Williams, W.C. Scott, Z. Wang, and B.W. Brooks. 2018. Cleaning product ingredient safety – What is the current state of availability of information regarding ingredients in products and their function? *ACS Sustainable Chem. Engr.* 6(2): 2094–2102.

Zhen, W., W.C. Scott, E.S. Williams, M. Ciarlo, **P.C. DeLeo**, and B.W. Brooks. 2018. Identification of novel uncertainty factors and thresholds of toxicological concern for health hazard and risk assessment: Application to cleaning product ingredients. *Environ. Int.* 113:357–376.

Ferrer, D.L., and **P.C. DeLeo**. 2017. Development of an in-stream environmental exposure model for assessing down-the-drain chemicals in Southern Ontario. *Water Quality Research Journal* 52(4):258-269.

Kapo, K.E., **DeLeo, P.C.**, Vamshi, R., Holmes, C.M., Ferrer, D., Dyer, S.D., Wang, X., White-Hull, C. 2016. iSTREEM®: An approach for broad-scale in-stream exposure assessment of “down-the-drain” chemicals. *Int. Environ. Assess. Mgmt*, 12: 782-792.

Schmier JK, Hulme-Lowe CK, Semenova S, Klenk JA, **DeLeo PC**, Sedlak R, Carlson PA. 2016. Estimated hospital costs associated with preventable health care-associated infections if health care antiseptic products were unavailable. *ClinicoEconomics and Outcomes Res.*, vol. 8:197-205.

Yost, L.J., Rodricks, J.D., Turnbull, D., **DeLeo, P.C.**, Nash, J.F., Quiñones-Rivera, A., Carlson, P.A. 2016. Human health risk assessment of chloroxyleneol in liquid hand soap and dishwashing soap used by consumers and health-care professionals. *Reg. Tox. and Pharm.*, 80:116-124.

Mudge, S. M., **DeLeo, P. C.** and Dyer, S. D. 2014. The effect of secondary treatment and ecoregion on the environmental fate of fatty alcohol based surfactants. *Science of the Total Environment* 471-471: 835-843. [doi:10.1016/j.scitotenv.2013.09.078](https://doi.org/10.1016/j.scitotenv.2013.09.078)

Mudge, S.M. and **P.C. DeLeo**. 2014. Estimating fatty alcohol contributions to the environment from laundry and personal care products using a market forensics approach. *Environ. Sci.: Processes Impacts*, 16: 74-80.

DeLeo, P.C. and R.I. Sedlak. 2014. Comment on “On the Need and Speed of Regulating Triclosan and Triclocarban in the United States”. 2014. *Environ. Sci. Technol.* 48 (19), pp 11021–11022. DOI: 10.1021/es503494j

Sanderson, H., Greggs, W., Cowan-Ellsberry, C., **DeLeo, P.** and Sedlak, R. 2013. Collection and dissemination of exposure data throughout the chemical value chain - a case study from a global consumer product industry. *Human and Ecological Risk Assessment* 19(4): 999-1013.

Mudge, S. M., **DeLeo, P. C.** and Dyer, S. D. 2012. Quantifying the anthropogenic fraction of fatty alcohols in a terrestrial environment. *Environ. Toxicol. Chem.* 31: 1209-1222.

Boxall AB, Rudd MA,... **DeLeo PC**, et al. 2012. Pharmaceuticals and Personal Care Products in the Environment: What Are the Big Questions? *Environ Health Perspect* 120:1221–1229; <http://dx.doi.org/10.1289/ehp.1104477>

DeLeo, P.C., S.M. Mudge, S.D. Dyer. 2011. Use of market forensics to estimate the environmental load of ingredients from consumer products. *Environ. Forensics* 12(4): 349-356.

DeLeo, P.C., Pawlowski, S., Barton, S. and Fort. D.J. 2011. Comment on “Effects of triclocarban, triclosan, and methyl triclosan on thyroid hormone action and stress in frog and mammalian culture systems.” *Environ. Sci. Technol.*, 45 (23), pp 10283–10284. <http://dx.doi.org/10.1021/es202937q>.

Mudge, S.M., W. Meier-Augenstein, C. Eadsforth and **P.C. DeLeo**. 2010. What contribution do detergent fatty alcohols make to sewage discharges and the marine environment? *J. Environ. Monit.* 12: 1846-1856.

SELECTED PRESENTATIONS

Kapo, K., R. Vamshi, C. Holmes, **P.C. DeLeo**, D. Ferrer. 2015. Broad-scale exposure modelling and risk assessment of consumer product ingredients: Applications and opportunities using the iSTREEM® model. The International Chemical Congress of Pacific Basin Societies (Pacifichem) 2015, Honolulu, Hawaii, December 15 - 20, 2015.

McDonough, K., T. Federle, K. Wehmeyer, S. Belanger, **P.C. DeLeo**. 2015. Evaluation of anionic surfactants in the environment using a novel approach for regional probabilistic exposure assessments. International Chemical Congress of Pacific Basin Societies (Pacifichem) 2015, Honolulu, Hawaii, Dec. 15 - 20, 2015.

DeLeo, P.C., E.S. Williams, M. Ciarlo, C. Pacelli, W. Greggs. 2015. Transparency in cleaning product formulation: What do we know about ingredients, their hazards, and potential for human exposure? The International Chemical Congress of Pacific Basin Societies (Pacifichem) 2015, Honolulu, Hawaii, December 15 - 20, 2015.

Williams, E.S., M. Ciarlo, C. Pacelli, W. Greggs, **P.C. DeLeo**. 2015. Cleaning product ingredient safety initiative: exposure estimates for cleaning product ingredients by chemical category and functional use class. Society for Risk Analysis Annual Meeting, Arlington, VA, December 6-10, 2015.

Williams, E.S., M. Ciarlo, C. Pacelli, W. Greggs, B. Brooks, **P.C. DeLeo**. 2015. Deterministic Exposure Assessment of Ingredients Used in Consumer Cleaning Products in the United States. SETAC North America, Salt Lake City, November 1-5, 2015.

Yost, L., J. Rodricks, D. Turnbull, **P.C. DeLeo**, J. Nash, A. Quinones-Rivera, P. Carlson. 2015. Human Health Risk Assessment of Chloroxylonol in Liquid Hand Soap and Dishwashing Soap Used by Consumers and Health-Care Professionals. SETAC North America, Salt Lake City, November 1-5, 2015.

DeLeo, P.C., D. Salvito, S.D. Dyer, B. Lewis, S. Gainey. 2015. Proceedings from a Collaborative Workshop Discussing Challenges in Characterizing Hazard Associated with Difficult-to-Test Substances – Part 2. SETAC North American, Salt Lake City, Nov. 1-5, 2015.

McDonough, K., K. Casteel, S. Belanger, K. Wehmeyer, T. Federle, **P.C. DeLeo**. Evaluation of anionic surfactants in the environment using a novel approach for regional probabilistic exposure assessments. SETAC North America, Salt Lake City, November 1-5, 2015.

DeLeo, P.C., C. Pacelli, E.S. Williams, M. Ciarlo. 2015. What is the purpose of ingredients used in household cleaning products? A study on the distribution of functions for ingredients in products. SETAC North America, Salt Lake City, November 1-5, 2015.

Vamshi, R., K. Kapo, M. Sebasky, C. Holmes, **P.C. DeLeo**, D. Ferrer. 2015. Development of iSTREEM® 2.0, new enhancements for down-the-drain model to support environmental exposure assessments across multiple commodity groups. SETAC North America, Salt Lake City, November 1-5, 2015.

Holmes, C., R. Vamshi, K. Kapo, M. Sebasky, **P.C. DeLeo**, D. Ferrer. 2015. Development of iSTREEM® 2.0, new enhancements for down-the-drain modeling to support environmental exposure assessments. Environmental Modeling Public Meeting, Environmental Protection Agency, Crystal City, VA, October 2015.

DeLeo, P.C., E.S. Williams, M. Ciarlo, C. Pacelli, W. Greggs. 2015. Cleaning product ingredient safety initiative: deterministic and aggregate exposure estimates for cleaning product ingredients. Int'l Soc. of Exposure Science Annual Meeting, Henderson, NV, October 2015.

DeLeo, P.C., E.S. Williams, M. Ciarlo, C. Pacelli, W. Greggs. 2015. Transparency in cleaning product formulation: What do we know about ingredients and potential for human exposure? 19th Annual ACS Green Chemistry and Engineering Conference, Bethesda, MD, July 2015.

Mudge, S.M., **P.C. DeLeo**, C. Eadsforth, R. Stackhouse, S. Belanger. 2015. How would changing the feedstock alter the fate or risk of my fatty alcohol-based surfactants? CESIO 10th World Surfactants Conference, Istanbul, June 2015.

McDonough, K., T. Federle, K. Wehmeyer, **P.C. DeLeo**. 2015. Evaluation of anionic surfactants in the environment using a novel approach for regional probabilistic exposure assessments. CESIO 10th World Surfactants Conference, Istanbul, June 2015.

Williams, E.S., M. Ciarlo, C. Pacelli, B. Greggs, **P.C. DeLeo**, B. Brooks. 2015. Cleaning Product Ingredient Safety Initiative: Product-Type-Specific Exposure Assessment. SETAC Europe 25th Annual Meeting, Barcelona, May 2015.

Ferrer, D.L., **P.C. DeLeo**, K. Kapo, C. Holmes. 2015. Estimating environmental exposure concentrations for formulated consumer products at broad geographic scale –application of iSTREEM® for fragrance materials. SETAC Europe Annual Meeting, Barcelona, May 2015.

Kapo, K., R. Vamshi, C. Holmes, **P. DeLeo**, D. Ferrer. 2015. Advancements in the assessment of micropollutants through the application of broad-scale "down-the-drain" exposure modelling. SETAC Europe 25th Annual Meeting, Barcelona, May 2015.

Williams, E.S., M. Ciarlo, C. Horne, W. Greggs, **P.C. DeLeo**, B. Brooks. 2014 Cleaning product ingredient safety initiative: exposure assessment for ingredients. Society for Risk Analysis Annual Meeting, December 7-11, 2014, Denver, CO, USA.

K. Kapo, R. Vamshi, C. Holmes, **P.C. DeLeo**, D. Ferrer. Recent Developments in exposure modeling of "down-the-drain" chemicals across multiple product groups. SETAC North America 35th Annual Meeting, November 9-13, 2014, Vancouver, BC, Canada.

Ferrer, D.L. and **P.C. DeLeo**. 2014. Data acquisition for a North American geospatial environmental exposure model for “down-the-drain” home and personal care product chemicals. SETAC North America 35th Annual Meeting, November 9-13, 2014, Vancouver, BC, Canada.

Williams, E.S. and **P.C. DeLeo**. 2014. A Multi-tier Approach to Characterizing Exposures to Cleaning Product Ingredients. 24th Annual Meeting of the International Society of Exposure Science, October 12-16, 2014, Cincinnati, OH.

Holmes, C.M., **P.C. DeLeo**, J.A. Weeks, K.E. Kapo. 2014. iSTREEM: A web-based river chemical concentration estimation model for consumer pesticide product chemicals. 13th IUPAC International Congress of Pesticide Chemistry, San Francisco, CA, August 10-14, 2014.

DeLeo, P.C., E.S. Williams, M. Ciarlo, C. Horne, W. Greggs. 2014. Transparency in cleaning product formulation – What do we know about ingredients and available hazard data? ACS Green Chemistry and Engineering Conference, June 17-19, 2014, North Bethesda, MD.

Ferrer, D.L. and **P.C. DeLeo**. 2014. Geospatial data acquisition and management in the development of a web-based environmental exposure model for the Great Lakes basin. Darci Ferrer and Paul DeLeo. IAGLR Annual Conference, Hamilton, Ontario. May 26-30, 2014.

Williams, E.S., M. Ciarlo, **P.C. DeLeo**, W. Greggs, C. Horne, K. Connors, B. Brooks. 2014. Cleaning Product Ingredient Safety Initiative: Development of the Hazard Database. Society of Toxicology’s 53rd Annual Meeting, Phoenix, Arizona. March 24–27, 2014.

Ferrer, D.L. and **P.C. DeLeo**. 2014. Geospatial data acquisition and management in the development of a web-based environmental exposure model for Southern Ontario. Central Canadian Symposium on Water Quality Research & Canadian Wastewater Management Conference, Niagara-on-the-Lake, Ontario. March 5-7, 2014.

P.C. DeLeo, M. Ciarlo, E.S. Williams, W. Greggs, W. Goodfellow. 2013 What’s out there in consumer products and the environment? A survey of home and personal care product ingredients and related safety information. SETAC Annual Meeting, Nashville, TN. Nov. 2013.

M. Ciarlo, **P.C. DeLeo**, C. Horne, W. Greggs, E.S. Williams. 2013. What ingredients are present in everyday home cleaning products? Preliminary findings and trends from the Cleaning Product Ingredient Safety Initiative. SETAC Annual Meeting, Nashville, TN. November 17-21, 2013.

E.S. Williams, M. Ciarlo, W. Greggs, C. Horne, K. Connors, B. Brooks, W. Goodfellow, **P.C. DeLeo**. Cleaning products ingredient safety initiative: Process for acquiring publicly available human health hazard data and assessment of data availability. SETAC Annual Meeting, Nashville, TN. November 17-21, 2013.

E.S. Williams, M. Ciarlo, W. Greggs, C. Horne, K. Connors, B. Brooks, W. Goodfellow, **P.C. DeLeo**. 2013. A summary of publicly available primary and categorical human health hazard data for cleaning products ingredients. SETAC Annual Meeting, Nashville, TN. Nov. 2013.

S.M. Mudge and **P.C. DeLeo**. 2013. Market Forensics as an Environmental Exposure Tool: Using Sales Data to Determine the Contribution of Personal Care Product Ingredients to WWTPs. SETAC North America Annual Meeting, Nashville, TN. November 17-21, 2013.

S. Pawlowski, M. Capdevielle, C. D’Ruiz, S. Belanger, G. Carr, **P.C. DeLeo**, B. Montemayor. 2013. A weight of evidence approach to the assessment of the bioaccumulation potential of triclosan in fish. SETAC North America Annual Meeting, Nashville, TN. Nov. 17-21, 2013.

S.M. Mudge and **P.C. DeLeo**. 2013. The risks to global water supplies from fatty alcohol based surfactants. CESIO 2013 – 9th World Surfactant Congress, Barcelona, Spain. June 10-14, 2013.

D. Ferrer, **P.C. DeLeo**, R.I. Sedlak Cleaning Product Ingredient Safety Initiative. CESIO 2013 - 9th World Surfactant Congress, Barcelona, Spain. June 10-14, 2013.

P.C. DeLeo. 2013. Tools for Screening Environmental Risks of Consumer Product Chemicals in the Great Lakes Watershed. IAGLR 56th Annual Conference on Great Lakes Research, West Lafayette, IN. June 4, 2013.

D.L. Ferrer and **P.C. DeLeo**. 2013. Geospatial data acquisition and management for a web based environmental fate model. 2013 SETAC-CPRC Annual Spring Meeting. April 22, 2013.

S.M. Mudge and **P.C. DeLeo**. 2012. The ecological risk of naturally-occurring and anthropogenic sources of personal care product ingredients: fatty alcohols and related surfactants. SETAC North America Annual Meeting, Long Beach, CA. November 11-15, 2012.

S.M. Mudge and **P.C. DeLeo**. 2012. The fate of high volume personal care product chemicals (fatty alcohols) in riverine environments: the effect of treatment type and Ecoregion. SETAC North America, Long Beach, CA. November 11-15, 2012.

P.C. DeLeo. Creating THE one-stop shop for cleaning product ingredient safety information. Cleaning Products Conference 2012, Baltimore, Maryland. October 3-5, 2012.

H. Sanderson, S. Belanger, **P.C. DeLeo**. 2012. Global regulatory environment and risk assessments for surfactants. SETAC Asia Pacific Meeting, Kumamoto, Japan. Sept 24-27, 2012.

P.C. DeLeo, S. Belanger, C. Cowan-Ellsberry, P. Dorn, S.D. Dyer, H. Sanderson, K. Stanton, D. Versteeg. 2012. A review of the confirmation of the environmental safety of major surfactants used in consumer products in North America. SETAC Asia Pacific Meeting, Kumamoto, Japan. September 24-27, 2012.

S. Mudge and **P.C. DeLeo**. 2012. Distinguishing between naturally-derived and anthropogenic sources of fatty alcohols present in freshwater environments. SETAC Asia Pacific Meeting, Kumamoto, Japan. September 24-27, 2012.

P.C. DeLeo, S.M. Mudge, S.D. Dyer. 2012. Use of market forensics to estimate the environmental load of Ingredients from consumer products. 8th National Monitoring Conference, Portland, Oregon. April 30 – May 4, 2012.

P.C. DeLeo, S.D. Dyer and X. Wang. 2012. iSTREEM™ - an internet-based national watershed scale model capable of determining where and when to monitor for chemicals from consumer products. 8th National Monitoring Conference, Portland, Oregon. April 30 – May 4, 2012.

P.C. DeLeo, S.D. Dyer, X. Wang. 2012. iSTREEM™ - a web-based river chemical concentration estimation model capable of determining where and when to monitor for consumer product chemicals. 47th Central Canadian Symposium on Water Quality Research, Burlington, Ontario. February 21-22, 2012.