

## **Treatment, Recycling, and Reuse of Unconventional Oilfield Produced Water**

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### **Abstract**

The Collaborative Laboratories for Environmental Analysis and Remediation (CLEAR) at The University of Texas Arlington, is a consortium of researchers interested in understanding the potential environmental implications of major anthropogenic processes, especially unconventional oil and gas extraction. CLEAR has developed chemical analysis methods and applied them to samples of groundwater, soil, air, and oilfield wastewater. With regard to produced water, a major byproduct of the UOG extraction process, CLEAR has worked with different companies to evaluate and improve their prospective water treatment technologies. This has included a multi-modal water treatment system, based on a series of traditional treatment modalities, as well as a comprehensive evaluation of forward osmosis treatment technology. Our instrumental analysis methods allow us to evaluate the effectiveness of treatment and removal strategies for both chemical and biological species from highly complex mixtures. Our hope is to facilitate beneficial re-use or recycling of treated water; different levels of treatment make the treated water more or less useful in different processes (hydraulic fracturing, land farming, etc.) where a reliance on fresh water can be reduced.

### **Brief Bio**

Kevin A. Schug is Professor and the Shimadzu Distinguished Professor of Analytical Chemistry in the Department of Chemistry and Biochemistry at The University of Texas at Arlington (UTA). He is also Director of the Collaborative Laboratories for Environmental Analysis and Remediation (CLEAR) at UTA. He received his B.S. degree in Chemistry in 1998 from the College of William and Mary, and his Ph.D. degree in Chemistry from Virginia Tech in 2002 under the direction of Prof. Harold M. McNair. From 2003-2005, he performed post-doctoral research at the University of Vienna in Austria with Prof. Dr. Wolfgang Lindner. Since joining UTA in 2005, his research has been focused on the theory and application of separation science and mass spectrometry for solving a variety of analytical and physical chemistry problems, in the fields of environmental, pharmaceutical, biological, and energy research. He has over 180 peer-reviewed publications and over 400 presentations, posters, and invited talks to his group's credit. He has been the primary mentor and research advisor to more than 30 graduate and 60 undergraduate students. Dr. Schug has received several research awards, including the 2009 Emerging Leader Award in Chromatography by LCGC Magazine and the 2013 American Chemical Society Division of Analytical Chemistry Young Investigator in Separation Science Award. Very recently, he was named to 2019 The Analytical Scientist's Top 100 Power List of the best analytical chemists in the world. For his teaching, he received the 2014 University of Texas System Regents' Outstanding Teaching Award and in 2017, was awarded the J. Calvin Giddings Award for Excellence in Analytical Chemistry Education by the American Chemical Society. He is a Fellow of both the University of Texas System's and U.T. Arlington's Academy Of Distinguished Teachers.