

## **Hydrologic Sciences on the Edge: The Revolution in Sensing and Strategies**

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**Abstract.** Hydrologic sciences and engineering, along with the rest of modern society, are being transformed by the explosion of low cost and widely distributed sensors. From the wind tunnel app on your phone to real-time transmission of river water quality data from my fishing waders, we and the public can measure and report the hydrologic world around us and transform these data into products that the community can use in near real time. The sensing world is also being transformed by the growth of processing power and the realization that “big data” really can be used for prediction. In this talk, I will present a series of examples on the use of distributed fiber-optic sensing; one new technique pirated from the oil and gas industry that is allowing us to measure hydrologic processes ranging for soil moisture to Antarctic glacier melting and stability. We will then move on to the next potentially transformative (and controversial!) advance in the use of drones and autonomous vehicles (UAS) to continually monitor our world. Hydrologic sciences, along with agriculture and ecological sciences are likely to see some of the most exciting results from drones in the next decade, and we need to be out leading this charge. Finally, our advances in sensing will only be valuable if framed in the context of appropriate science and engineering questions, i.e., those of societal relevance. The expectation of a population of 10 billion by 2050 and several degrees warmer across the world will have tremendous impacts on terrestrial hydrologic systems; some of those impacts that we have already seen in the last century with the simple adoption of irrigated agriculture. Hydrologic sciences needs to rise to this challenge of prediction of change and we will close with some thoughts on how to organize and energize our community to lead the charge in quantifying and efficiently predicting human changes in the hydrologic systems.