

# H31F-01 Lessons from Seven Years and 200 Students Developing Environmental Sensors: Open-Sensing.org (Invited)



Wednesday, 11 December 2024



08:30 - 08:40



147 B (Convention Center)

## Abstract

Understanding the state and changes in the hydrosphere is challenging due to the breadth of the community required for success. We start with an objective: what is it that we seek to observe and why? This consideration leads to the specification of a measurement. These specifications must embody the environmental requirements, the skill-level of those making the measurements, and the technological options available. A team approach is required, bringing together earth science, sociology, and instrument engineering skills. The historical approach has been to await the arrival of a uniquely insightful single person who could span all of these requirements, but this is neither reproduceable, nor is it feasible in the long term as all aspects get more complex (e.g., in terms of recording data, going from a pen and paper, to a data logger, to a telemetry system, to a bi-directional remote dynamic instrument control system). Thus, we must train people to become members of environmental sensing teams: each person must not only understand their domain, but also must reach laterally to understand the context in which they are working. This implies, for example, that engineers on these teams must understand the basics of environmental systems. This is best started within the educational framework of a university, but the stove-piped framework of current engineering educations makes this exceedingly difficult to achieve. The OPEnS lab seeks to train engineering students to be members of environmental sensing teams through mentored experience in a multi-disciplinary setting. We have graduated about 200 such students who have developed over 20 environmental sensing systems. Here, drawing from our experiences over the last 7 years, I recount the challenges we have faced, and emphasize the importance of pushing students to participate in field work, requiring comprehensive documentation, and most fundamentally, the foundational challenge of developing clear specifications so that everyone agrees on

the initial project goals as well as a process for these to evolve informed by experience. We see the OPEnS lab as one element of the community of effort to advance our understanding of earth systems through the development of novel sensing systems.

---

## Plain-language Summary

---

Developing sensing systems for earth is a team sport - requiring coordinated effort of engineers, environmental scientists, and policy experts. In this talk we describe our experience in seeking to advance environmental sensing from the engineering perspective.

---

## First Author

---



**John Steven Selker**  
Oregon State University

---

## View Related

---