



CUAHSI-HMF Hands-on Workshop Distributed Sensing: Taking it to the field

Boulder CO July 16-18, 2008

Motivation and Modality

In hydrologic science, as well as environmental science generally, understanding is limited by the frequency and spatial distribution of co-located multi-parameter observations. For more than a decade, wireless “mote” sensing platforms have been touted as a key technology to address this need, during which time cellular phones, and wireless internet services have been socially transformative. Remarkably, the availability of robust turn-key wireless environmental sensing systems has been limited, even in the context of significant investments from industry, the National Science Foundation, and university research teams. This workshop will provide a benchmark for the technology, including multiple installations of networks of sensing systems, syntheses of the state of the art in each of the critical technological components, and opportunity to take part in formal and casual conversation with practitioners and vendors. Participants will leave the event up-to-date with the state of the art in development and deployable systems.

A Hands-on Workshop on Wireless Autonomously Powered Environmental Sensing will be held July 16-18, in Boulder, Colorado. The workshop will immediately follow the CUAHSI national Biennial science meeting. It will be a hands-on workshop, exploring the current state of the art of distributed sensing, for environmental observation. The workshop will include field installations, current practitioners, manufacturers, and scientists interested in including these methods in their research programs. The spaces in the workshop will be limited to 60 participants, with representation balanced between each of the categories. The workshop will include extended lectures followed by plenary discussions of the following topics:

- Sensor selection: Long-wave, short-wave, snow depth, air temperature, RH, wind speed and direction, soil moisture, soil matric potential, precipitation, skin temperature, sound level, and imagery.
- Sensor calibration, operation, and maintenance
- Communication standards: all about 802.15.4 Zigbee, 802.11g, n, s etc

- Network operation: single and multi-hop algorithms, on-the-fly reprogramming
- Data flow and management
- Web-servers of data.
- Environmental Challenges: snow, rain, trees, buildings, vandalism, high wind, extreme temperature.

Registration

To reserve a space, contact Susan Dobbie (Susan.Dobbie@oregonstate.edu). Please make your checks or money orders payable to: OSU and remit to Susan Dobbie at 116 Gilmore Hall, Corvallis, OR 97331. Registration is not binding until payment is received.

Cost

\$300 per person (including meals).

Participant Opportunities

We seek to stimulate a diversity of participants, each of whom will bring content to the workshop. Financial support will be provided for this participation, including:

1. Network demonstration support. Individuals from not-for-profit organizations wishing to set up demonstrations of networked sensing systems will be provided up to \$1000 each to cover costs of shipping and one day of per diem to assist in set up and take-down of their system. Companies wishing to demonstrate systems are also invited to do so, with per diem support available.
2. Posters presenting current installations. Individuals submitting a 150-300 word abstract with their registration, and bringing a poster communicating their findings, will be given a \$100 discount on registration.
3. Students may apply for up to \$150 in support for their participation (poster presentation required).

Instructors

TBA

Coordinator

[John Selker](#) – Oregon State University

Sponsors

The Consortium of Universities for the Advancement of Hydrologic Sciences ([CUAHSI](#))
Hydrologic Measurement Facility ([HMF](#))
The National Science Foundation

Program

Wednesday July 16

- 11:00-13:00** Registration
- 13:00-13:30** Introduction to the Workshop and Participant Introductions (Selker)
- 13:30-15:00** Introduction to Wireless Sensing 1: Radios and Power
- 15:00-16:00** Introduction to Wireless Sensing 2: Sensor Selection: Soils and Water
- 16:00-16:30** Coffee break
- 16:30-17:30** Introduction to Wireless Sensing 3: Sensor Selection 2: Micrometeorology
- 17:30-18:00** Introduction to Wireless Sensing 4: Data bases and web access
- 18:00-19:00** Dinner (in demo area)
- 18:00-22:00** Industrial demonstrations 1: hardware, software, and specifications

Thursday July 17

- 7:30-8:30** Breakfast
- 8:30-10:00** Field teams: goals of installations, overview of activities
- 10:00-10:30** Team briefings: cautions and activities, work plans
- 10:30-12:00** System installations
- 12:00-13:30** Working lunch in the field
- 13:30-15:00** Debriefing of installations – demos of data streams
- 15:00-15:30** Coffee break
- 15:30-16:30** Communication 101: single and multi-hop options and rationale
- 16:30-18:00** Pop-up session of installations to date: 5 minute sneak previews of posters
- 18:00-19:30** Dinner (in poster area)
- 19:30-22:00** Dinner and poster session: Installations to date

Friday July 18

- 7:30-8:30** Breakfast
- 8:30-9:30** Installations to date: Hydrologic Sensing
- 9:30-10:30** Installations to date: Biological Sensing
- 10:30-12:00** System installations: tour of all installations
- 12:00-13:30** Lunch – Keynote talk TBA
- 13:30-14:30** Introduction to Wireless Sensing 5: Metadata and QA/QC
- 14:30-15:15** Sensor calibration: using the power of a network
- 15:15-17:00** Evaluation and Wrap-up Discussion