

NIOSH Center for Direct Reading and Sensor Technologies

NIOSH Board of Scientific Counselors

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The Internet of Things

Many experts say the rise of embedded and wearable computing will bring the next revolution in digital technology. Upsides are enhanced health, convenience, productivity, safety and vastly more useful information for people and organizations. The downsides are challenges to personal privacy, over-hyped expectations, and tech complexity that boggles us.

PEW Research Center May 2014



The Past



Early microbiologists

Early Microbiologists

Gary Larson
The Far Side

The Future

Communities:
Infrastructure,
population
demographics

Environment: Real-time
reading of air, soil, water,
temperature and humidity

People: Monitor
movements, track
fitness and health,
biomonitoring



Adapted from PEW Research Center 2014

2008 DREAM Initiative

- Basic research needs
- Research needs and gaps for DREAM devices/methods
 - New devices or sensors
 - Improvements to existing devices
- Guidance or policy recommendations
 - Partnerships
 - Standards/guidelines/recommendations
 - Training
- Worker empowerment

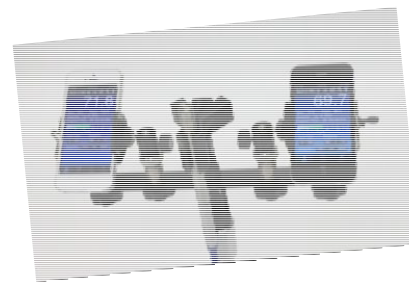
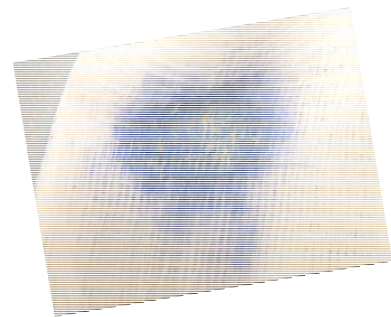


Technology is Expanding Exponentially

- Improvement of measurement science
- Readily available geographic and spatial information
- Miniaturization of instruments
- Utilization of smart phone/tablet technologies
- Wearable sensors
- Embedded sensors



NIOSH Center for Direct Reading and Sensor Technologies



Enabling a new era of worker safety, health, well-being, and productivity

Intramural DREAM Strategic Plan

- Strategic Goal #1. Development of DREAM (single or combination devices)
- Strategic Goal #2. Development of Guidance and Standard Methods for the Use of DREAM (validation criteria and training)
- Strategic Goal #3. Development of research on data streaming, gathering, transmission, handling management approaches and informatics



The Focus of the Center

- Coordinate a national agenda for direct-reading methods and sensor technologies
- Develop guidance documents pertinent to direct-reading methods and sensors, including validation and performance characteristics
- Develop training protocols
- Establish partnerships to collaborate in the Center's activities
- Develop an intramural pilot project opportunity



Recent Activities

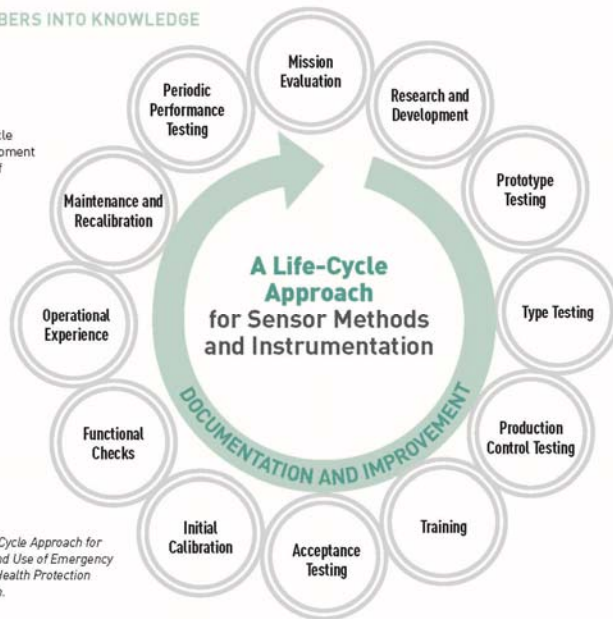
- 2014 EPA Air Sensors meeting panels and presentations
- Director's Desk article in August 2014
- Topic page released in August 2014
- Two webinars summer of 2014, four planned for 2015
- 2014 ISES training course on direct-reading methods
- 2014 ISES technical session on direct-reading methods
- March 2015 Synergist article; April 2015 Educational webinar
- Partnered with AIHA to develop educational materials on multi-gas meters.
- 2015 AIHCE presentation
- ES21 Federal working group, including grant opportunities



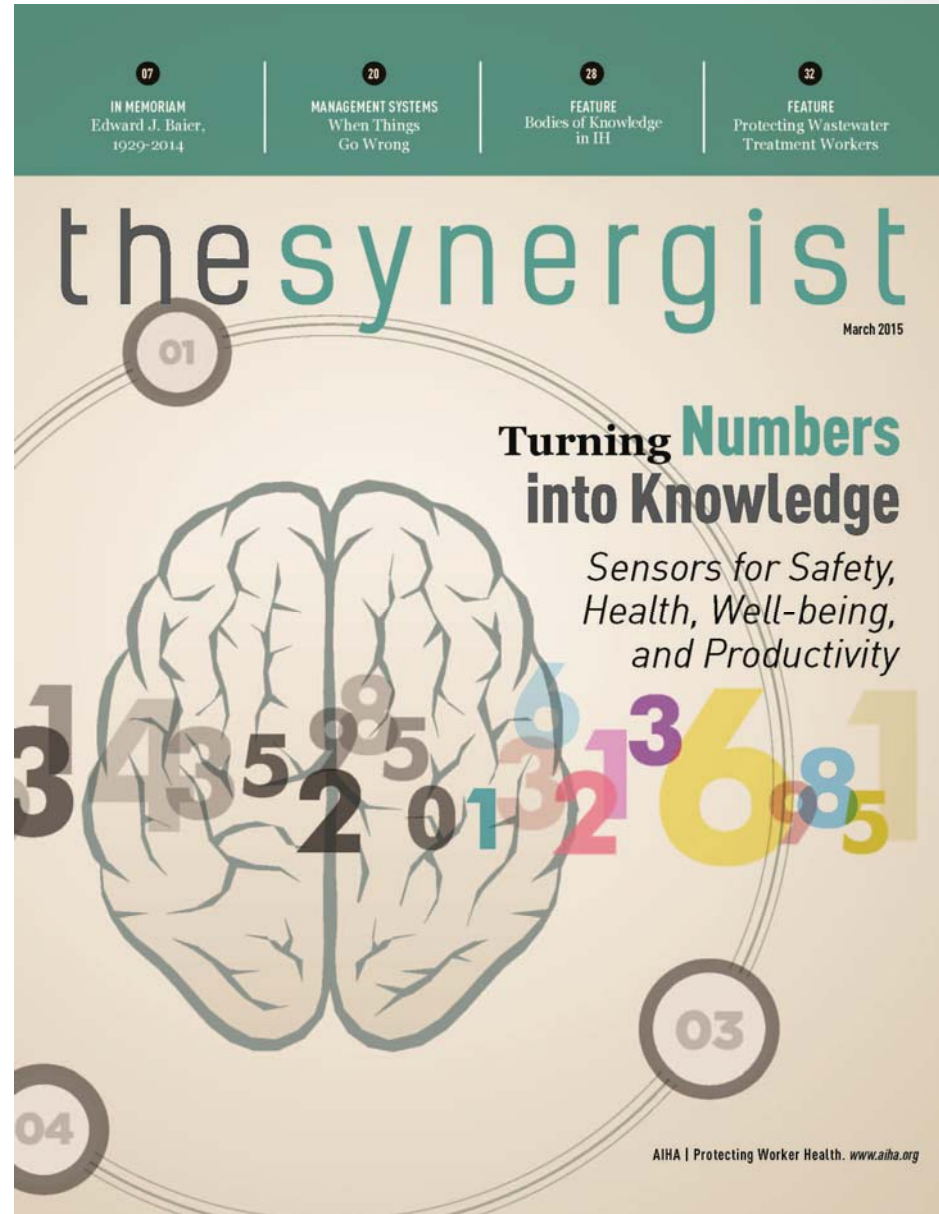
What are our next steps for *Turning Numbers into Knowledge?*

TURNING NUMBERS INTO KNOWLEDGE

Figure 1. Life-cycle stages for development and application of sensors.



Source: *A Life-Cycle Approach for Development and Use of Emergency Response and Health Protection Instrumentation.*



Overarching Issues

- What is the essential or central role for NIOSH?
- How can NIOSH have an impact in this area?
 - Examples:
 - How can NIOSH facilitate **validation** of popularized sensors. For example, smart phone noise apps?
 - How can NIOSH facilitate **use** of data collected by sensors in occupational safety and health research or practice?



Some Future Activities

- *NIOSH Manual of Analytical Methods* Guidance Chapter on direct reading instruments for gases and vapors
 - Addition of direct reading methods to the NMAM
- OPHPR project to develop a guidance document on the use of new sensors in emergency response
- Inventory of NIOSH projects related to sensors



What Issues Should We Be Addressing in Greater Detail?

- Ethics and security
- “Fit-for-purpose” criteria
- Instrument performance characteristics and validation
- Data collection, management, and modelling
- Other priorities?



Questions?

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