Science of soot lands Sandia Lab's Hope Michelsen in Women's Hall of Fame

Black carbon measurements important in environmental research efforts

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Sandia National Laboratories scientist Hope Michelsen, who peers through atmospheric soot to learn about the air we breathe, has been named by Alameda County Women's Hall of Fame as its 2013 Outstanding Woman in Science. She is the first Sandia employee to receive this award.

Michelsen, who is the first Sandia employee to receive this award, is being honored for her work in developing methods of measuring soot, understanding how soot is formed and building and deploying processes that use computer models of the atmosphere to identify the origins of greenhouse gases.

"Hope's work in atmospheric science has been outstanding and clearly places her in the prestigious ranks of the Alameda County Women's Hall of Fame," said Bob Carling, director of Sandia's Transportation Energy Center in Livermore. "This is a well-deserved recognition."
Looking back, Michelsen said she has been drawn to science her entire life.

"Even before I understood what a scientist was, I was acting like one, writing everything down in notebooks and just being captivated by data," she said.

But science wasn't Michelsen's only love. She began college at Dartmouth College as an English major.

"I always loved to write," she said. "The great thing about being a scientist is I get to do so much writing."

She was interested in environmental science, but switched her major to chemistry at the suggestion of her department chair at Dartmouth. She earned her doctorate in chemistry from Stanford University, researching surface science and physical chemistry.

"After getting my PhD, I wanted to do something different, so I went to Harvard

as a post-doc and studied atmospheric chemistry," she said.
Michelsen has been at Sandia for 13 years, where she discovered another fascinating research area: black carbon, i.e., soot.

"I had never expected to study soot, but it's actually very cool," she said. "On a microscopic level, soot is usually composed of very small carbonaceous particles that are tightly bound together in dendrite chains, like the arms of a tree. It is really quite beautiful."

One goal of Michelsen's research is to understand what happens when soot is measured and how that affects the measurement itself.

"We want to make measurements more quantitative under a whole range of conditions," she said. "The particles are tiny to begin with and, as environmental regulations become tighter, we need to be able to measure the smallest ones."

In another project, Michelsen and her Sandia colleagues are collaborating to better understand how soot is formed. She is also part of a team that built a mobile greenhouse gas test facility that measures greenhouse gases and other similar chemicals so they can be traced and identified. She is now leading an internally-funded project to build a similar instrument to measure black carbon in the atmosphere.

Michelsen received her award along with nine other winners, on March 23 at a special ceremony in Oakland.

The Women's Hall of Fame was established in 1993 by the Alameda County Board of Supervisors, the Alameda County Health Care Foundation and the Alameda County Commission on the Status of Women. This is the 20th anniversary of the award program, which now has honored 176 local women.