

PARTICULARS

The E-Newsletter of the American Association for Aerosol Research

WINTER 2015

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Letter From the Editor

Hello Readers!

Welcome to the Winter 2015 edition of *Particulars*, the official newsletter of AAAR. In this packed issue, we have a letter from new AAAR President, **Sheryl Ehrman**. Sheryl provides a re-cap of the recent AAAR annual meeting, and updates on newsworthy items going on in the Association. Also in this issue, **Jeff Pierce** highlights aerosols making the news in 'In Case You Missed It'. Jeff also interviews **Kelley Barsanti** in the 'Aerosol Scientist Spotlight'. **Kristina Wagstrom**, new member of the *Particulars* staff, profiles a recent article from the AAAR journal in 'AS&T Article Highlight.' Finally, **Chris Sorensen** provides details about a new online educational initiative that he is leading.



Just a Reminder for ALL AAAR Job Seekers:

Check the **Career Opportunities** page of the AAAR website—new and exciting job postings are added throughout the year!

Do you have Questions or Comments for the Newsletter?

Provide feedback on *Particulars* by emailing:

info@aaar.org
subject: newsletter

Chris Hennigan, Editor

Organizational Members: AAAR would like to thank the companies that support us as Organizational Members:



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**35th Annual Conference
October 17-21, 2016**

**Oregon Convention Center
Portland, Oregon**

President's Message

Dear Colleagues,

It was wonderful to see so many friends and to make new ones at the most recent AAAR conference in Minneapolis this past October! It was a great meeting, with 787 registered attendees, 246 of whom were students, 372 platform and 318 poster presentations, and 24 exhibitors. We were able to support over 50 students with travel grants this year! A highlight for me was visiting the **History of Aerosol Science Exhibit**. Some of the sampling devices and instruments I used as a student were included in the exhibit but so it goes. Thanks to all of our colleagues who developed these tools, we've made history with all of the resulting new knowledge.

Looking ahead, we will see some major changes in the next year with our journal, *Aerosol Science and Technology*. It gives me great pleasure to share the news that **Warren Finlay**, of the University of Alberta, will be taking the helm as Editor-in-Chief of *Aerosol Science and Technology* in May 2016, following in the footsteps of **Peter McMurry**, who served as Editor-in-Chief for eight years. Warren has been involved with the journal for many years, serving as an Editor since 2008, and on the Editorial Advisory Board of the journal before 2008. Among his many distinctions, he is a Fellow of the AAAR, he is the recipient of the **2008 Thomas T. Mercer Prize**, awarded jointly by the AAAR and the International Society for Aerosols in Medicine, and he is a Fellow of the Royal Society of Canada.

Another major change will be our **Online Education Task Force's Instructional Video Initiative**. Please see the call for proposals in this issue of *Particulars* and send **Chris Sorensen** your proposal. This is an excellent opportunity to build resources for training the next generation of aerosol scientists!

We will be seeing some changes also with our **aaar.org** website to improve its member functionality and update the layout. There is a feature (*added in last year's updates*) that I hope more members will utilize: in the **Members Only** section, under your **member profile**, you can indicate your past AAAR committee service and you can indicate if you are interested in serving on one of AAAR's many committees. If you have an interest in service with AAAR, please let us know! I have been involved with AAAR starting in 1993 as a graduate student attending my first conference, and have stayed active one way or another ever since.

I look forward to the year ahead and to seeing everyone in Portland in Fall 2016!

Sheryl Ehrman, AAAR President

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In Case You Missed It...

By Jeff Pierce

Smoke in West:

Large portions of the western US were covered with smoke this summer. In early July, long-range transport of smoke from wildfires in Canada covered the region.

<http://blogs.mprnews.org/updraft/2015/07/breathing-easier-weekend-heat-wave/>

While in late August, smoke from wildfires in Washington, Idaho and northern California engulfed much of the west.

<http://blogs.discovermagazine.com/imageo/2015/08/20/wildfire-smoke-drifts-across-1000-miles-of-the-west/#.VigXk3VGjUY>

Both these events yielded $PM_{2.5}$ concentrations over $100 \mu g m^{-3}$ over large portions of the US west.

Aerosol Deposition in a Model Lung:

Researchers in Haifa, Israel have built a model lung with realistic flows and airways to investigate the size-resolved movement and deposition of particles in the lung.

http://www.nature.com/articles/srep14071?WT.ec_id=SREP-639-20150915&spMailingID=49555282&spUserID=ODkwMTM2NjQzMgS2&spJbID=762176358&spReportId=NzYyMTc2MzU4S0

Metal Aerosols and Childhood Development:

Australian researchers have found that arsenic, cadmium and lead are elevated in aerosols and soils in an Australian mining town. Education scores in this town are significantly lower than comparable towns without the elevated metals levels.

<http://www.sciencedirect.com/science/article/pii/S0269749115300841>

Aerosols and Indian Monsoon:

Researchers at MIT have found that aerosols have a large impact on the location and seasonality of the South Asian summer monsoon. These changes are driven by the aerosol direct effect where reduced solar radiation at the surface affects surface heating and evaporation.

<http://phys.org/news/2015-10-manmade-aerosols-rainfall-world-populous.html>

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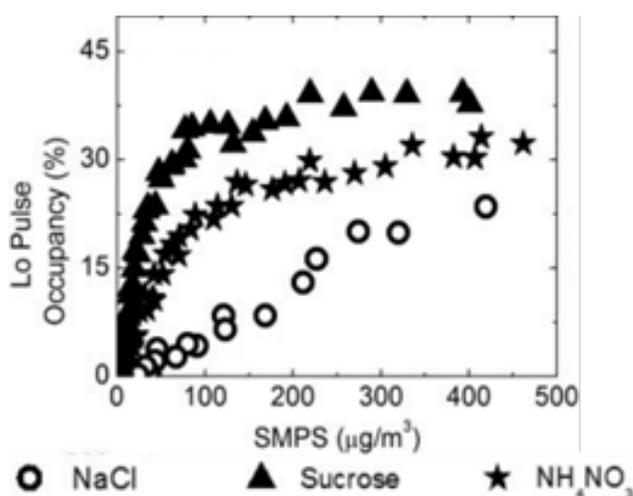
By Kristina Wagstrom

Laboratory Evaluation and Calibration of Three Low-Cost Particle Sensors for Particulate Matter Measurements

Y. Wang, J. Li, H. Jing, Q. Zhang, J. Jiang, P. Biswas
Aerosol Science and Technology, Vol. 49, 1063-1077, 2015

The recent influx of low cost particle sensing technologies on the market has the potential to expand the capabilities of researchers in a variety of studies and create a range of citizen science opportunities. These low cost options typically operate using light scattering. The light emitted by an infrared emitting diode is scattered by particles before reaching a phototransistor; the amount of light reaching the phototransistor is inversely proportional to the particle concentration. Even though these sensors are gaining popularity, many of them still lack extensive evaluation against reference methods.

The authors of this manuscript evaluate three ultra-low cost particulate matter sensors costing under \$20 against a TSI SidePak and scanning mobility particle sizer (SMPS) in a laboratory setting. They evaluate the impact of particle composition, particle size, temperature, and relative humidity on the performance of the sensors over a wide range of particle concentrations and ambient conditions. The impact on performance from changes in particle composition and size are most pronounced. The figure below shows the correlation between the **Shinyei PPD42NS** low cost particulate matter sensor and a **TSI SMPS** for sodium chloride, sucrose, and ammonium nitrate. Temperature and relative humidity also impact the sensor performance but not to the same degree as composition and size. The results of this evaluation brings forward the importance of considering all the factors potentially impacting the performance of these low cost sensors as they are applied in an increasing number of situations.



**Sensor Performance
Dependence on Particle
Composition for a
Shinyei PPD42NS**

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Aerosol Scientist Spotlight: Kelley Barsanti

By Jeff Pierce

Please tell us about your education and experience.

I've always been driven by a love for the natural world and a desire to understand how natural systems function, and how we can best maintain those functions given increasing population and resource demands. My high school biology and chemistry teachers were incredibly inspiring, and my parents were both teachers at one point in their careers. I guess if you put all of those things together and shake... you end up with an academic career in Environmental Engineering. I have a B.A. in Environmental Studies and Environmental Biology from the University of Colorado-Boulder, and my M.S. and Ph.D. are in Environmental Engineering from the Oregon Graduate Institute School of Science & Engineering. I love studying aerosols because it ties together the biology and chemistry, environmental issues and engineering solutions.

You recently moved to UC Riverside, what excites you about your move?

UC Riverside has an amazing legacy in atmospheric chemistry and air quality, and these programs are incredibly strong today. There are too many things to be excited about! I have to admit to being a little star struck by Bill Carter and I really look forward to working with him. There are a number of collaborative opportunities within Engineering and CE-CERT, most obviously within the Emissions Research and Atmospheric Processes labs; however I'm also looking forward to the opportunities that will unfold across the University.

How did you get involved with aerosol research?

While I was pursuing my M.S. degree at OGI, I started working for **Jim Pankow**. We were using NMR to determine the amount of free-base nicotine in tobacco smoke. Quite quickly I was completely hooked on pursuing research. Following my M.S., I moved from doing lab work on tobacco smoke to doing theoretical modeling of secondary organic aerosol formation and I haven't stopped since (*though I've expanded!*).

Which people in our field have influenced you the most?

Jim Pankow has undoubtedly influenced my career the most. I appreciate that because our field is relatively new, we have the opportunity to work directly with the people that have made the most significant contributions; I count Jim, **John Seinfeld**, and **Peter McMurry** among those people. Many in our generation of aerosol scientists and engineers also serve as an inspiration, and **Annamarie Carlton** and **Jesse Kroll** immediately come to my mind.

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What is, in your opinion, the most interesting research contribution you've made so far?

Well, I'm not sure if I would characterize it as "interesting", but one of the most fulfilling contributions has been the paper I led on the role of organic salt formation in new particle formation and the work that has grown from it. It was the first paper I wrote following my Ph.D. It was a perfect synthesis of what I'd learned during my M.S. and Ph.D. research, applied in the context of new particle formation. Jim Smith and Peter McMurry had data from a number of locations indicating small alkylamines were present in nanometer-sized particles, despite their relatively high vapor pressures. It was the work that I'd done on tobacco smoke and the gas/particle partitioning papers written by Jim Pankow that got me thinking about acid/base chemistry. We still don't have a complete understanding of the relative roles of acid/base chemistry, accretion, and condensation of extremely low volatility compounds on the growth of very small particles ($\sim 2\text{-}10\text{ nm}$) in different environments.

What research questions do you hope to answer?

From a broader impacts perspective, I think that I have the same research questions as many in our field. I'd like to contribute to understanding the relative roles of anthropogenic and biogenic emissions in secondary organic particle formation at high spatial resolution, and of the roles of secondary organic particle formation on regional climate change (*e.g., through the formation of brown carbon and new particle formation*). I hope to make my most significant research contributions by helping to develop the predictive modeling tools to answer these research questions. For me that means developing better emissions inventories of volatile organic compounds and improving our model representation of gas- and particle-phase chemistry relevant for secondary organic aerosol formation.

Are there new aerosol research areas that you see developing in the near future?

That is a hard one! I am sure there will be. While I'm optimistic about the progress we can make in developing better chemistry and climate models, specifically in regard to the roles of aerosols, it still seems like there are lifetimes of work to be done. I guess I am so focused on that problem, that I don't spend too much time thinking about other areas of aerosol research.

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AAAR On-Line Education Task Force

By Chris Sorensen, Chair, On-Line Education Task Force

Call for Instructive Videos

The AAAR On-Line Education Task Force is calling for proposals from the entire AAAR membership to create instructive videos. These videos would be in the spirit of the tutorials given on the first day of the annual AAAR conference. We envision that they would be approximately 10 minutes in length and have a lecture format, perhaps with demonstrations, with the speaker at a white or black board explaining a subject relevant to aerosol science and technology. However, we are open to creative ideas for other formats. Topics that require more than 10 minutes should be broken up into a series of segments of that length. The finished video would be posted on the AAAR website. The proposal should be about one-half page in length describing the topic, estimated length and style of presentation. The Task Force will review proposals and notify the proposer of acceptance.

We sincerely hope that the membership will see this as a splendid opportunity to enhance the perceived relevance of aerosol science and technology in our modern world and a chance to further enhance our collegiality.

**Please submit your proposals at
any time to: sor@phys.ksu.edu**



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2015 AAAR Award Winners *Congratulations to all of the award winners honored at this year's annual meeting!*

Thomas T. Mercer Joint Prize

Omar S. Usmani, Imperial College, London

Kenneth T. Whitby Award

Marcus Petters, North Carolina State University

V. Faye McNeill, Columbia University

David Sinclair Award

Sonia M. Kreidenweis, Colorado State University

Sheldon K. Friedlander Award

Tran B. Nguyen, University of California, Davis

Benjamin Y.H. Liu Award

Mark R. Stolzenburg, University of Minnesota

2015 AAAR Fellow

Lara A. Gundel, University of California at Berkeley

2015 AS&T Outstanding Publication Award

Richard C. Flagan

Shih Chen Wang

"Scanning Electrical Mobility Spectrometer"

Student Poster Awards

Danielle C. Draper, Reed College

Haviland Forrister, Georgia Institute of Technology

Kyle Gorkowski, Carnegie Mellon University

Kelsey Haddad, Washington University

Rachel Hems, University of Toronto

John Kodros, Colorado State University

Justin Maughan, Kansas State University

Nathaniel May, University of Michigan

Yensil Park, Ohio State University

Kyle Pierce, University of Denver

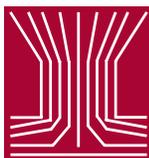
Gautham Sekar, Clarkson University

Nirmala Thomas, Rutgers

Samantha Thompson, University of Colorado, Boulder

Ashley Vizenor, University of California, Riverside

Ningxin Wang, Carnegie Mellon University



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