PARTICULARS

The E-Newsletter of the American Association for Aerosol Research

WINTER 2016

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As always, we'd love any feedback or suggestions you may have for ***Particulars***.

Simply email **info@aaar.org** with the subject line '**Particulars**'.

Jeff Pierce, *Editor*

American Association for Aerosol Research (AAAR)

11130 Sunrise Valley Drive | Suite 350
Reston, VA 20191

T: 703.437.4377 OR 800.485.3106
E: info@aaar.org | www.aaar.org

President's Message

Dear Colleagues,

It was wonderful to see so many friends in Portland at the AAAR annual conference this past October! It was a great meeting, with more than 800 registered attendees and 24 exhibitors. With support from NASA, NSF, and EPA we were able to support almost 50 students with travel grants this year! An innovation this year was the new conference app for navigating the program and other material. **Mark Swihart** did an outstanding job as conference chair. Also, thanks to our members, exhibitors, sponsors, and administrative staff—it takes a team to create a great meeting. **Please take a moment to fill out the online conference survey *(https://www.surveymonkey.com/r/AAAR2016conference)***.

We have just completed a major upgrade with our **aaar.org** website. Thanks to **Sheryl Ehrman** and **Lupita Montaya** for leading the charge. The new website contains 17 AAAR Aerosol History Videos **(https://www.aaar.org/about-aaar/aerosol-history-interviews/)**. Each video contains a full length interview with a notable aerosol scientist. I encourage everyone to check them out!

We have made important progress to formalize policies for the AAAR endowment. With leadership from **David Ensor**, a bylaw amendment has been approved by the membership to codify operations. The endowment contributes to the fulfillment of AAAR's mission to promote and communicate technical advances in the field of aerosol research by ensuring a reliable flow of funds to support critical activities. We currently have six endowment funds, which support our awards and the Friedlander lecture. The Board has designated $100,000 in matching funds to encourage donors to establish new funds. If you have interest in establishing a new fund please contact **Phil Hopke**, chair of the endowment committee (**phopke@clarkson.edu**).

AAAR is a volunteer-driven organization. I encourage everyone to get involved. If you are interested in service with AAAR, please let us know! A great way to do this is to update your member profile in the Members Only section of the website. In your profile you can indicate your past AAAR committee service and future service interests.

I look forward to the year ahead and to seeing everyone in Raleigh in Fall 2017! ●

Allen Robinson, *AAAR President*

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2016 AAAR Award Winners

Sheldon K. Friedlander Award:
Gabriel Isaacman-VanWertz

Benjamin H.Y. Liu Award:
Rodney J. Weber

David Sinclair Award:
Spyros Pandis

Kenneth T. Whitby Award:
Nga Lee Ng

Thomas T. Mercer Joint Prize:
Joe L. Mauderly

In Case You Missed It

By Kristina Wagstrom

Aerosols may be hiding the true impacts of climate change on hurricane intensity

http://www.climatecentral.org/news/aerosols-masking-hurricane-trend-20599

Climate change may have as much as doubled the amount of land subject to forest fires in the United States

http://www.earthinstitute.columbia.edu/articles/view/3343

Aerosols from e-cigarettes may cause cell damage

http://www.medscape.com/viewarticle/866195

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AS&T Article Highlight

By Jason D. Surratt

Laboratory characterization of an aerosol chemical speciation monitor with PM2.5 measurement capability

W. Xu, P. Croteau, L. Williams, M. Canagaratna, T. Onasch, E. Cross, X. Zhang, W. Robinson, D. Worsnop, J. Jayne

Aerosol Science and Technology, in press, DOI:10.1080/02786826.2016.1241859

Atmospheric fine aerosol (PM2.5, particulate matter with aerodynamic diameter $\leq 2.5\ \mu m$) have a critical role in the Earth's climate system and adversely impact air quality and human health. These effects are linked with their physicochemical properties, including size, chemical composition and mass concentration. Aerosol mass spectrometers (AMS), such as the Aerosol Chemical Speciation Monitor (ACSM), have been developed in order to quantify these properties in near real-time. The real-time nature of these instruments has dramatically improved our understanding of the sources of atmospheric aerosol, especially for organic aerosol (OA) over the last decade. The ACSM was developed in order to serve as a long-term and continuous aerosol monitoring alternative to the high-resolution (HR) AMS instruments, especially due to their lower cost, simplified data acquisition and analysis interface, and comparable composition measurement capabilities to the HR-AMS; however, the ACSM does not measure particle size like the AMS instruments. These properties make it possible for the ACSM to serve as a future PM2.5 monitor due to easier routine use by field site technicians/operators. Excitingly, ACSM instruments have already demonstrated that they can resolve similar OA sources as the "classic" AMS instruments, including primary OA (POA) such as biomass burning OA (BBOA), and secondary OA (SOA) such as isoprene epoxydiol (IEPOX)-derived SOA. Although the ACSM has proven to be a potentially useful monitoring technique, it has limited detection efficiency for super-micron aerosol. In order to be used for general monitoring purposes, an ACSM with PM2.5 measurement capability is required to meet mass-based air quality reporting standards. This newsletter's featured article addresses this major limitation of existing ACSM instruments by designing and characterizing a PM2.5 ACSM system consisting of a new inlet system, an intermediate pressure lens (IPL), and a capture vaporizer (CV).

As the authors carefully describe in this article, the new sampling inlet design minimizes large size particle loss by straightening plumbing to the ACSM aerodynamic lens. The incorporation of a straight-through flow path filter switching valve was found to be an important part of the new sampling system. The new lens and CV are tested in lab using a quadrupole AMS system equipped with light scattering module. Their

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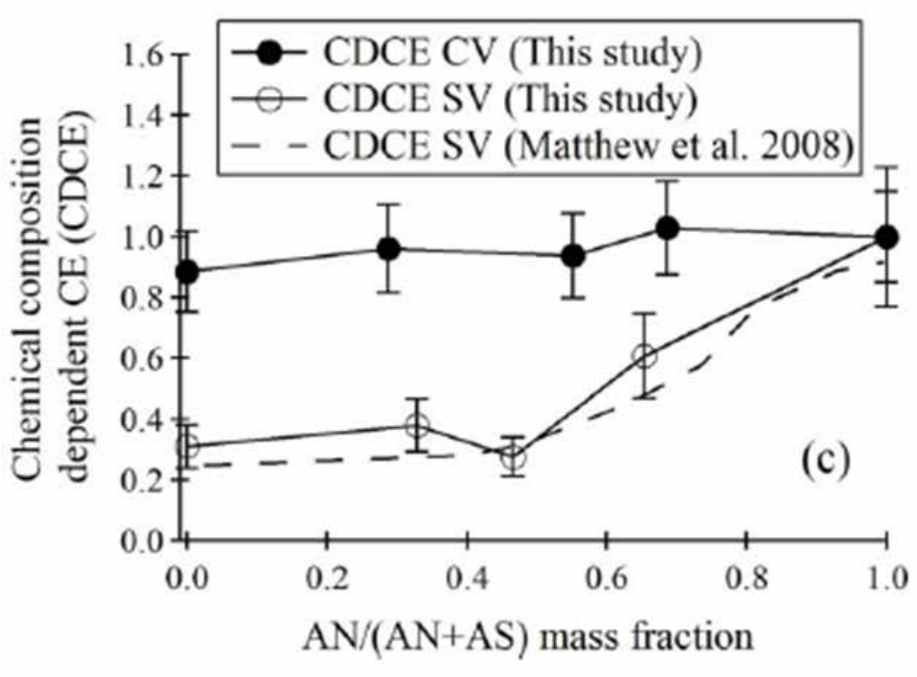
results show that the CV introduces additional thermal decomposition of both inorganic and organic compounds, requiring modifications to the existing AMS fragmentation table that is used to partition fragment ions to chemical species. As shown in the figure below from this study, measurements of nitrate, sulfate, and ammonium using mixtures of (NH4)2SO4 and NH4NO3 also show detection of these species with the CV is matrix-independent. This figure also shows the improved collection efficiency (CE) compared to the standard vaporizer (SV) used in prior versions of ACSMs. When the authors consider a typical ambient PM2.5 size distribution, they find that 89% of the non-refractory mass is detected with this new system, while was only 65% with the old system. The authors conclude by stating that field measurements are underway to compare measurements from the new PM2.5 ACSM system with collocated measurements and will be the focus of future papers. Due to the enhanced monitoring potential of this new PM2.5 inlet for the ACSM, we felt it was worth highlighting this study for our readers. ●

Chemical composition-dependent collection efficiency (CDCE) for the capture vaporizer (CV) compared with that for the standard vaporizer (SV).



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Get to know your new AS&T Editor-in-Chief

By Jeff Pierce

Warren Finlay started as Editor-in-Chief for AAAR's journal, *Aerosol Science & Technology*, this past May. We've interviewed Warren to help you get to know him better.

Please tell us about your education and experience.

I received my PhD from Stanford University, and I have been a Professor at the University of Alberta for 29 years.

How did you get involved with aerosol research?

That's an interesting story. I started my career in fundamental fluid mechanics, using spectral methods to do direct numerical simulations of the Navier-Stokes equations. Back then we had a department secretary who would write down phone messages when we missed phone calls. I kept getting written phone messages telling me to call some physician about asthma. I assumed it was a wrong number. But after the 3rd such message, I called the phone number to let them know they had a wrong number. But it wasn't a wrong number. It turned out this physician felt that aerosol drug delivery devices weren't well understood and he wanted to talk to a mechanical engineer. That was 25 years ago. To cut a long story short, that's when I started working with aerosols and their application to respiratory drug delivery.

Which people in our field have influenced you the most?

I remember reading Fuchs' book 25 years ago—it was already 30 years old at the time—and I recall being amazed at how much was already known about aerosol behavior by the mid-20th century. Some of the seminal in vivo work on inhaled aerosols out of Germany by Heyder, Stahlhofen, Gebhart, Rudolf and colleagues, as well as the work out of New York by Lippmann and his students, still guides the field more than 30 years later. In my service as Editor-in-Chief (EIC), my most recent predecessors Pete McMurry, Rick Flagan and Phil Hopke are all outstanding role models.

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What do you consider your greatest contribution to aerosol science so far?

Our work on aerosol behavior in the upper airways has probably had the most impact on human health. It's now regularly relied on by most companies that design and develop new aerosol inhalers used daily by many millions of people worldwide.

Have you served as an editor for journals prior to your Editor-in-Chief position with AS&T?

Before becoming Editor-in-Chief, I served as an Editor for AS&T for 8 years, and I have served on the editorial advisory boards of half a dozen different journals.

What is your vision for the future of AS&T?

AS&T is viewed by some as mostly an instrument journal, and that is certainly an essential part of the journal. But I see AS&T's focus as being quite broad, covering all aspects of aerosol research but keeping its emphasis on exploration, innovation and scientific conversation rather than on routine modeling and measurement. AAAR members are an amazing bunch, doing interesting research on a huge range of topics. My vision of AS&T mirrors that diversity of topics. AAAR members are wonderfully supportive of the annual conference and of the journal. I know I can count on them to send us their best manuscripts, and to help maintain AS&T as a vibrant, wide-ranging, exciting platform to present their work. ●

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Jeff Pierce*, Editor*