

PARTICULARS

The E-Newsletter of the American Association for Aerosol Research

SUMMER 2019

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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**'

Jason Surratt, Editor

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President's Message

Dear Colleagues,

The annual meeting is upon us, with the opportunity once again to learn about the latest and greatest in aerosol research. Each year, the assortment of plenaries, special symposia, tutorials and numerous platform and

poster presentations help us keep up-to-date with new developments in our fast changing field. This year is no exception as Sally Ng has put together an outstanding meeting. But, have you thought about other ways the annual meeting might assist you professionally? I'm speaking specifically about leadership development. How does one progress from student to practitioner to leader in one's field? The annual meeting can help. Start by attending one

or more working group meetings, which provide the opportunity to suggest future directions for the annual meeting including plenary speakers, tutorial topics and special symposia. Come to the annual business meeting and learn how the Association actually "works". Volunteer to serve on a committee that makes use of your current skills and/or helps you to develop new ones. Opportunities abound from finances to education to publications and social media. (This is not a complete list!). And, as you become more and more active in the Association, you may find yourself serving as a working group chair or member of the Board of Directors. Looking over my own career, I realize that much of what I learned about leadership came from AAAR in just these ways.

I wish the same for you as you continue your professional journey. ●

Murray Johnston
AAAR President



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Dear Colleagues:

I look forward to seeing many of you at the **37th AAAR Annual Conference**, to be held **October 14-18** at the Oregon Convention Center in Portland, Oregon. The program will follow our usual format, with tutorials on Monday, an exhibition from Tuesday to Thursday, and poster and platform presentations from Tuesday morning to Friday noon.

Our outstanding lineup of plenary speakers for 2019 includes:

Flemming Cassee

National Institute for Public Health and the Environment, Netherlands

Shelly Miller

University of Colorado Boulder

Hope Michelsen

Sandia National Laboratories

Neil Donahue

Carnegie Mellon University

We will have four symposia designed to bridge multiple areas and promote cross-disciplinary interaction on the following topics:

1. *From Aerosol Dosimetry and Toxicology to Health*
2. *Biomass Combustion: Emissions, Chemistry, Air Quality, Climate, and Human Health*
3. *The Air We Breathe: Indoor Aerosol Sources and Chemistry*
4. *Air Quality Sensors: Low-Cost != Low Complexity*

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Further details of the tutorials, special symposia, and plenary sessions are available on the conference web page at:

<https://www.aaar.org/2019/>

Those of you who submitted your conference abstracts before the April 26 deadline should already have a poster or platform assignment for your presentation listed in the preliminary technical program, posted online at:

<https://www.aaar.org/2019/program/>

If for any reason you cannot present your paper, please contact us immediately via e-mail at: support@aaarabstracts.com. This will minimize the number of corrections to the program once it goes into print. Abstracts submitted between April 26 and the **late breaking poster** submission deadline of July 19 will be added to the conference program in early August. Students (and their advisors) should check the conference website for **student travel grant** information — these applications will be due on **August 5**. All registrants this year will have free access to the **AAAR Conference Mobile App** with all conference details.

In addition to a wonderful technical program, we would like to draw your attention to the following exciting events at 2019 AAAR Conference. For detailed information about each special event, please refer to the conference website:

<https://www.aaar.org/2019/program/>

We have two new initiatives this year:

- ▶ **Meet the Job Seekers:** This new poster session is for job seekers to present their background and expertise to potential employers across academia, government, and industry; also for potential employers to meet the job seekers. Current graduate students (graduating this year or next year), postdoctoral researchers, and research scientists who are seeking jobs in the near future will present a poster during this session. The poster session will take place at the same time as the AAAR Welcome Reception (Tuesday 6-8pm) in the exhibit hall.
- ▶ **Meet the Program Managers:** This year, AAAR is also bringing the program managers to you in Portland, including **NSF**, **EPRI**, **EPA**, **NASA**, **DHS**, and **DTRA**. You can sign up for a 15-min meeting with program managers from various funding agencies. This will be a great opportunity to meet the program managers, gain insights for successful proposals, and learn about different agencies.

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Following last year's success, we will continue the following events this year:

- ▶ **Meet the Pioneers:** This year's featured pioneers are **Lara Gundel** (Lawrence Berkeley Laboratory), **Spyros Pandis** (University of Patras and Carnegie Mellon University), and **Roger McClellan** (Independent advisor on inhalation toxicology and risk analysis).
- ▶ **Fine Particle Art Competition:** We will have a **Particle Art Competition** and an **Aerosol Video Competition**. Submission deadline is September 16. Monetary prizes will be awarded this year.
- ▶ **Early Career Event:** The Early Career Event will feature a panel of speakers: **Jill Craven** (Intel), **Philip Fine** (South Coast Air Quality Management District), **Lelia Hawkins** (Harvey Mudd College), **Gabriel Isaacman-VanWertz** (Virginia Tech), and **Devin Wiley** (Circumvent Pharmaceuticals).
- ▶ **Celebrating Diversity and Inclusivity within AAAR:** This is an informal gathering to celebrate diversity and inclusivity within AAAR at a nearby restaurant following the AAAR Welcome Reception. You can sign up for the event when registering for the conference.
- ▶ **Fun Run:** The 3.2 mi/5.2 km out-and-back course will start at the Quality Inn Downtown Convention Center and follow the Eastbank Esplanade along the Willamette River. Sign up on the AAAR conference registration form.

The 2019 Conference will be held at the Oregon Convention Center, which is located along the Portland light rail system, providing easy access to the airport and downtown. Portland is a beautiful city that sits on the Columbia and Willamette rivers, with snow-capped Mount Hood in the distance. It has many fabulous restaurants, museums, and gardens, and hundreds of other sightseeing opportunities.

A conference block of reduced rate rooms has been secured at the DoubleTree by Hilton and the Quality Inn Downtown Convention Center. **Room reservations** in the AAAR room block must be made no later than **September 19** and **September 23**, respectively. We anticipate, however, that the AAAR room block will sell out quickly, so please reserve your place as soon as possible. Further hotel and travel details are included on the conference web page at:

<https://www.aaar.org/2019/>

Thanks to all of the working group chairs, symposium organizers, and others who have worked hard to put together an outstanding 2019 conference! *I look forward to seeing you there!*

Nga Lee (Sally) Ng

2019 AAAR Conference Chair

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AS&T Article Highlight

By Gabriel Isaacman-VanWertz

"Comparison of aerosol measurement systems during the 2016 airborne ARISTO campaign"

John Ortega, Jefferson R. Snider, James N. Smith
& J. Michael Reeves

Aerosol Science and Technology, 53:8, 871-885, 2019.

<https://doi.org/10.1080/02786826.2019.1610554>

A wide range of instrumentation has been developed to measure particle concentrations and size distributions, and it is not unusual for a single field campaign or lab experiment to use several different particle sizing or counting instruments. These instruments may span different size ranges, rely on different operating principles, or be operated under different conditions, all of which may impact the scientific interpretation of the data they produce. Unfortunately, intercomparisons between these instruments are rarely the focus of a study, so may not be given sufficient attention or performed with enough detail to identify or understand differences between instruments. The NSF-sponsored Airborne Research Instrumentation Testing Opportunity (ARISTO) discussed in this work is unique in that it focused specifically on comparing and understanding different instruments. Ortega and co-authors provide in this work an excellent example of an informative and important instrument intercomparison performed during several research flights during 2016. They analyze data from multiple particle sizing and counting instruments to understand the extent to which they agree, and the corrections needed to reconcile discrepancies.

Five instruments are compared during several research flights, covering a variety of operating principles and particle size ranges. Two Condensation Particle Counters (CPC) counted all particles with no size resolution down to diameters of 3 and 11 nanometers, a Scanning Mobility Particle Sizer (SMPS) provided measurement of particles with diameters of tens to hundreds of nanometers with size-resolution across two different switchable size ranges, and two Ultra-High Sensitivity Aerosol Spectrometers (UHSAS) provided size-resolved measurement of submicron particles down to tens of nanometers. As expected, total particle counts were similar between CPCs and were higher than measured by instruments with narrower size ranges, and size distributions measured by size-resolved instruments matched very well where the diameters overlap. These encouraging results are illustrated by the reproduced figures below. The authors further tested the performance of two different inlets and instrument installations. They found no major difference between wing-mounted and rack-mounted instruments or different aerosol inlets once corrected for pressure and temperature differences. These results were not without some complications, though. For instance, a correction for altitude was necessary because flows within the CPC with the lower cutpoint

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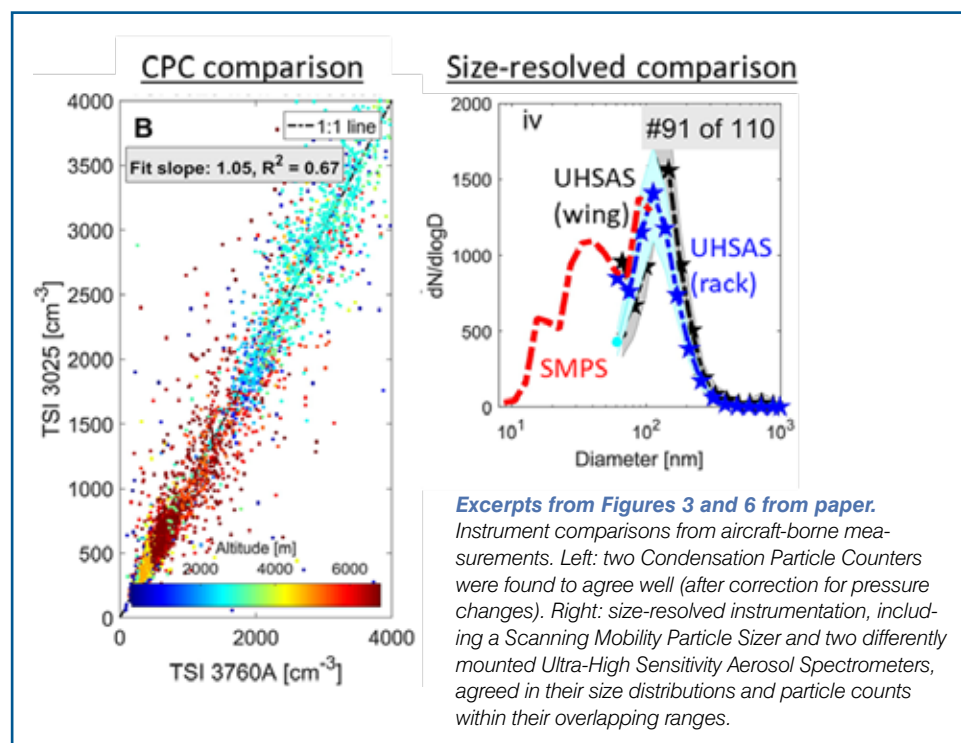
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were pressure sensitive – this correction was limited by a lack of laboratory data below 1500 meters due to the high altitude of their Boulder, CO lab (1625 m ASL)! Additionally, different size-resolved instruments also used different diameter bins, requiring data to be re-scaled and reconciled for meaningful comparisons. However, by monitoring and correcting for instrument parameters, instrument differences were properly corrected for.



By carefully comparing five different instruments, Ortega and co-workers perform a critical but often overlooked task in our field: making sure our instruments agree and ensuring that we understand their strengths and weaknesses. They demonstrate generally good agreement, but highlight a number of important operation considerations and details. In particular, an abundance of data was collected on instrument pressures, temperatures, and flows, both before and during research flights. Understanding these operating conditions was critical for correcting data. Overall, this work paints a reassuring picture, demonstrating that our instruments can be trusted and agree well, but it is important for operators to understand the operating principles, and pay careful attention to the details. ●

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Student Chapter Updates

University of California – Irvine (UCI)

The AAAR student chapter at UCI has had a busy first year. Chapter members organized panels that invited UCI alumni to give advice to current students for careers after graduating. We had three panels that focused on careers in industry, government/policy, and academia. Over the summer, the chapter hosted open workshops where we taught data analysis tools through basic skills in R and Igor. For the upcoming fall quarter, we will host workshops geared toward undergraduate students that focus on applying to graduate school, writing a personal statement, and developing a CV.

University of Florida

Each spring, the University of Florida student chapter hosts the Air Quality Workshop, which is a meeting for students, academics, and industry professionals. The workshop was attended by Florida State University, University of Central Florida, and University of South Florida, where 10 oral presentations and 9 poster presentations were given and discussed. Keynote speech was given by an industry partner Koogler and Associates, Max Lee. Representatives from Zefron International and National Council for Air and Stream Improvement were in attendance. The intermingling of industry and academia produced a relaxed forum that engaged all, stirred ideas, and drove research projects in the most relevant direction. The presentations were not limited to students; industry partners have presented on their projects in the past; however, only students presented this year. There was a mix of undergraduate, masters and PhD researchers to present their research. An interesting highlight of this year's workshop was that an online master's student presented at the workshop for the first time. It was exciting engagement and an excellent experience for the student who otherwise would not have had a research presentation interaction like this during his degree. We appreciate the support from AAAR as their sponsorship helps the student chapter keep running strong! *Figure 1 shows the attendees of the event.*



Figure 1- Photograph of the researchers from USF, UCF, FSU, UF, Zefron, NCASI, and Koogler at the conclusion of the 2019 Air Workshop.

Photo credit: Random student in hallway at student union.

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Clarkson University

The Clarkson University Student Chapter is planning to strengthen the network with alumni working in industries (e.g., automobile, HVAC, and pharmaceutical companies) and academic institutions. The chapter is working to set up a shared spreadsheet containing the contact information of alumni and to set up conference calls with some of alumni in the Fall semester to discuss career development as an aerosol researcher.

University of Cincinnati

Members of the University of Cincinnati AAAR Student Chapter annually attend and participate in several local workshops and symposia. Every Fall, the University of Cincinnati Education and Research Center hosts the Pilot Research Project Symposium, in which aerosol-related pilot studies are very prominent. The symposium is preceded by a career fair targeting undergraduate students interested in graduate studies. As a part of the career fair, AAAR student chapter members give lab tours, educating prospective students on aerosol research methods and ongoing studies. This spring, Masters and Ph.D. students studying aerosol science presented their theses and dissertation research at the NIOSH Manufacturing Sector Council meeting.

Colorado State University

The AAAR club at Colorado State University has recently been focused on bringing students and postdocs who work on aerosols together from various departments across campus. We have regularly held a group happy hour once per month following our university's atmospheric chemistry group meeting. At the end of the summer, we are planning a get together for new students/postdocs interested in aerosol science to meet current AAAR members. We are also in the early stages of planning a student/postdoc-led research project at the Storm Peak Research Lab in Steamboat Springs. ●



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In Case You Missed It

By Ben Murphy

UK Government to target reductions in mobile-source brake and tire wear emissions among other sources.

The UK Department for Environment Food and Rural Affairs' (DEFRA) Air Quality Expert Group recently published a detailed report on Non-Exhaust Emissions from Road Traffic. The group recommends that pollution from brake, tire, and road wear be recognized as a source of ambient particulate matter, even for vehicles with zero exhaust emissions. They further argue for work towards a consistent international standard of measurement for non-exhaust emissions to reduce uncertainties in emission factors and for work to better understand strategies for reducing this source. The subject of the report mirrors sections of DEFRA's Clean Air Strategy (published in January 2019) which, while recognizing the continued improvement in emissions from mobile exhaust, emphasizes a focus on non-exhaust emissions.

"Government to tackle particulate matter and microplastic pollution from cars,"

Open Access Government, 11 July 2019

<https://www.openaccessgovernment.org/microplastic-pollution-from-cars/68897/>

"Clean Air Strategy 2019,"

DEFRA, 14 Jan 2019

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf

"Non-Exhaust Emissions from Road Traffic," Air Quality Expert Group, 9 July 2019

https://uk-air.defra.gov.uk/assets/documents/reports/cat09/1907101151_20190709_Non_Exhaust_Emissions_typeset_Final.pdf

US Reductions in ambient PM from 1990-2015 have had significant impacts on longevity at national and county scales.

Researchers have used county level and nation-wide population data for 2.5 decades to show, via a statistical model, the loss of life expectancy attributable to current PM_{2.5} pollution. Leveraging a wealth of data including vital registration data, per capita income, education, unemployment, urbanicity, smoking, and meteorology, the authors powered four Bayesian spatiotemporal models resolved at the county level to directly estimate percent

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increase in county-level age-specific death rates associated with annual PM2.5 concentrations. The analysis showed that improvements in air quality during the study years led to an increase of 0.17 years life expectancy for females and 0.15 for males. However, current PM2.5 levels still cause substantial life expectancy reductions compared to observed minimum concentrations.

"Particulate matter air pollution and national and county life expectancy loss in the USA: A spatiotemporal analysis,"
Public Library of Science: Medicine, 23 July 2019

<https://journals.plos.org/plosmedicine/article/file?id=10.1371/journal.pmed.1002856> HYPERLINK "<https://journals.plos.org/plosmedicine/article/file?id=10.1371/journal.pmed.1002856&type=printable>"& HYPERLINK "<https://journals.plos.org/plosmedicine/article/file?id=10.1371/journal.pmed.1002856&type=printable>"type=printable.

Awareness of risks due to smoke exposure from fire events leads to growing presence of air quality specialists on U.S. wildfire response teams.

The growing number of wildfires and resulting severe air quality events has led to increased awareness of health concerns from exposure to smoke in addition to the imminent destruction of the fire. This need has led the U.S. Forest Service to train and dispatch air resource advisers to analyze data from satellites, ground monitors and weather models and get information out to the public. This information is used to help make decisions and avoid the worst acute health impacts, especially for sensitive populations like children and the elderly. Currently, about 95 advisers are available to be sent across the country for two weeks at a time.

"Growing program puts air quality specialists on wildfires,"
Associated Press, Aug 6 2019

<https://abcnews.go.com/Health/wireStory/growing-program-puts-air-quality-specialists-wildfires-64803534>.

Extreme arctic fires are ravaging the high latitudes and releasing megatons of CO2 and other pollutants to region.

Wildfires in the arctic have increased in number and size this year, due in part to extremely warm temperatures across the region. In June and July, more than 100 long-lived and intense fires raged in Alaska, Siberia and parts of Greenland. Fifty megatons of CO2 (equivalent to the annual emissions of Sweden) were released by these fires in June, and July is thought to have seen the highest emissions in a decade. Climate experts are also concerned about the massive emissions of soot to the atmosphere, since it will reduce the albedo of snow when it deposits and further enhance

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warming in the area. Efforts to extinguish the fires in Siberia have so far been unsuccessful; some estimates put the area burned at 4.5 million hectares as of August 6.

"Arctic fires fill the skies with soot,"
NASA Earth Observatory, Aug 2019

<https://earthobservatory.nasa.gov/images/145380/arctic-fires-fill-the-skies-with-soot>

"The Arctic is on fire, and these images from space show the choking smoke,"
CNET, July 31, 2019.

<https://www.cnet.com/news/the-arctic-is-on-fire-and-these-nasa-images-from-space-show-the-choking-smoke/>

"Siberia's wildfires getting bigger despite Russian airforce intervention, Greenpeace warns,"
Euronews, Aug 6 2019

<https://www.euronews.com/2019/08/06/siberian-wildfires-engulf-area-almost-the-size-belgium-as-states-of-emergency-are-declared> •



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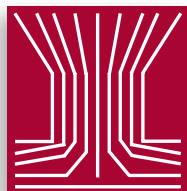
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