



American Association for Aerosol Research

PARTICULARS

Summer 2011

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Briefing from the Editor

Satoshi Takahama

Dear Colleagues,

Thanks to Max and Deanna for keeping this newsletter together. I'll be taking over for the Editor role alongside new committee members (and future successors), Kathy and Sherri. I joined the AAAR community as a student in 2000, and have been kicking around pretty much every year since. It's a good place to be -- hope you feel the same way.

I hope everyone submitted abstracts for the conference in Orlando this year -- if not, you will still get a chance to submit a late-breaking poster in the summer.

Please take a look at notable highlights from our research community in the segments Aerosols in the Spotlight and In Case You Missed It.

Looking forward to another strong year for aerosol science.

Satoshi

Celebrate AAAR's 30th Annual Conference in Orlando!

Lynn Russell
Conference Chair

We hope that you will join us in continuing our 30 years of cutting-edge aerosol meetings with this year's meeting in Orlando, FL, Oct. 3-7, 2011, for the 30th Annual Conference of the American Association of Aerosol Research (<http://aaar.conference2011.org/>). This year's annual conference is packed with a record-breaking number of presenters, and we look forward to seeing you among us. The conference has a rich tradition of highlighting innovations in aerosol science and technology in a week of engaging tutorials, plenaries, posters and talks. Those who submit abstracts will have an opportunity to present their latest findings to an intellectually astute and

professionally dedicated community. All who attend will benefit from the latest advances across the full frontier of aerosol science and technology. It's a great opportunity to renew old acquaintances and meet new colleagues, and includes a variety of Tutorials, Plenary Speakers, Special Symposia, and Exhibits.

AAAR welcomes all who are new to, or on the edge of the aerosol field, to attend and engage with this welcoming community. On Monday, Oct. 3, we will offer 16 comprehensive **Tutorials** on current aerosol topics, from fundamental physics to the latest breakthroughs in measurements and modeling. Tutorials are specially designed to bring newcomers up to speed in a variety of fields, so take this opportunity to learn something new! We look forward to four engaging **Plenary Speakers** this year, who together span the breadth of AAAR science. From Tuesday, Oct. 4, through Friday, Oct. 7, we will start each day with a new plenary topic. The topics will be (i) indoor aerosol exposure as part of this year's AEESP Lecture (Lynn Hildemann, Stanford University), (ii) aerosols and precipitation, from the "Albrecht effect" to "POCs" (Bruce Albrecht, University of Miami), (iii) health impacts of particle pollution from the perspective of cardiology, with a special look at the embedded disparities of these impacts (Wayne Cascio, MD, Environmental Protection Agency), and (iv) the physical characterization of fractal aggregates, an exploration paralleling 30 years of AAAR from Friedlander Lecturer (Chris Sorensen, University of Kansas).

In addition to the plenary lectures, the technical program features six parallel platform and two plenary poster sessions with plenty of scheduled breaks for informal exchange. You can still sign up to present your work in any of the 25 different topical poster sessions by submitting your abstract before the July 22 deadline to <http://aaarabstracts.com/2011/>. Six **Special Symposia** will focus attention on Nanotoxicology, Microscopy and Other Single-Particle Techniques for Studying Aerosols, Nanoscale Aerosol Physics with New Light Sources, Recent Campaigns in the North American West Coast, Aerosols and Precipitation, and Chemical and Biological Defense Hazard Assessment. The **Exhibits** will be open Monday through Thursday and will provide an opportunity to engage with and learn from leading companies offering instrumentation and services in aerosol science and technology. On Friday, expect a birthday surprise in recognition of our 30 years!

There is still time to register for the conference at the reduced "Early Bird" rate before the July 25 deadline at <http://aaar.conference2011.org/content/registration>.

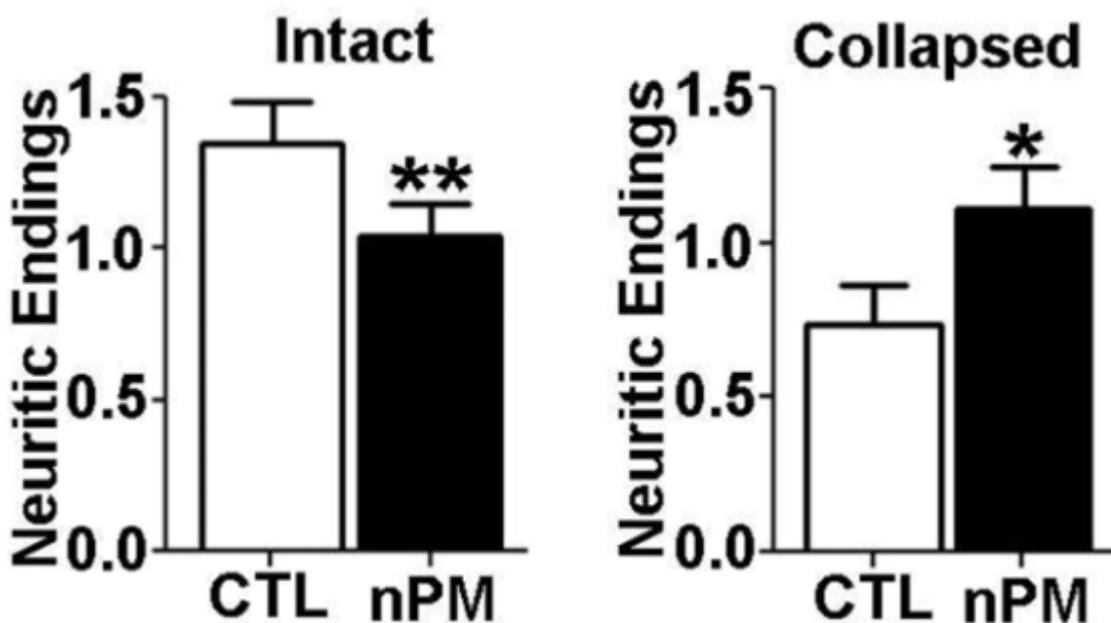
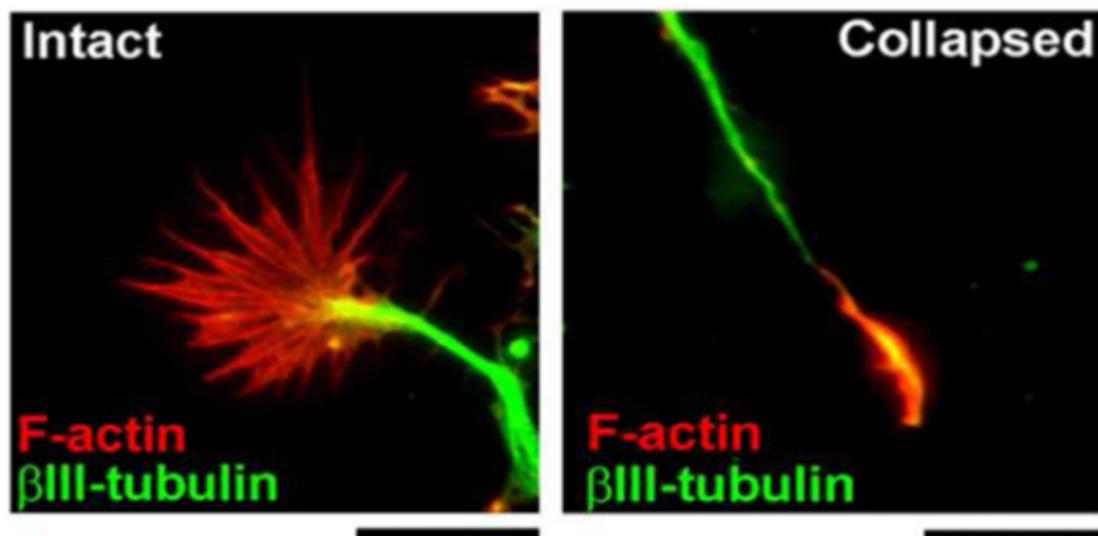
You will also want to book your room at the conference hotel, the fabulous **Rosen Shingle Creek Resort in Orlando**. This luxurious facility offers nature trails, fishing, outdoor swimming pools, a sand volleyball court, lighted tennis courts, a full-service spa, and an 18-hole championship golf course. The site is conveniently close to Orlando International Airport (10 mi). In October, we can expect the weather in Orlando to be pleasantly warm (average high = 29.5 °C; average low = 18.5 °C; average sunshine = 8 hours per day). The city is renowned for its array of tourist attractions, including the new Wizarding World of Harry Potter at nearby Universal Orlando Resort (17 mi), and many other world famous attractions at SeaWorld Orlando (3 mi), Walt Disney World (13 mi). Come early! Stay late! Bring your family!

Aerosols in the Spotlight

Toxicological Evidence that Inhalation of Nanoscale Particulates in Urban Air Pollution Can Damage Brain Neurons

A group from University of Southern California (Morgan et al 2011) implemented a novel technology for experimental toxicological exposure to airborne PM. Ambient nanoscale urban particulate matter (nPM, <200nm) near a freeway was collected on filters for 1 month and transferred into an aqueous suspension for re-aerosolization at the time of rodent exposure. In vivo studies revealed two new cellular reactions to nPM observed in rodent microglia (non-neuronal cells that provide support and protection for the brain's neurons) and neurons: chronic nPM inhalation induced microglial-monocytic markers (indicators of neuron distress) and lysosomal-associated membrane proteins (cells that breakdown waste) and reduced neuronal receptor protein levels. In vitro models with developing brain cells indicate neurotoxicity of aqueous suspensions of nPM. In cultured neonatal hippocampal slices exposed to nPM for 48 hr, neurons showed increased uptake of propidium iodide (PI), an indicator of cell death. These in vitro models suggest that nPM has both direct neurotoxicity through glutamatergic mechanisms and indirect neurotoxicity through glial secretions.

The evident neurotoxicity of nPM suggests links between urban air pollution and brain health across the lifespan. The impairment of neurite outgrowth by nPM is consistent with epidemiologic evidence of developmental effects of air pollution in children (Suglia et al. 2008; Perera et al. 2009), which include an association with autism (Volk et al. 2010).



In primary neuron cultures, nPM caused growth cone collapse.

"In Case You Missed It"

How Much Does the Clean Air Act Really Cost?

The cumulative benefits of reducing fine particle and ground level ozone pollution under the 1990 Clean Air Act amendments will reach approximately \$2 trillion in 2020, saving 230,000 people from early death in that year alone. These are the results of a study released by the US Environmental Protection Agency in March 2011. These benefits (including avoiding early death, preventing heart

attacks and asthma attacks, and reducing the number of sick days for employees) exceed the costs of implementing Clean Air Act protections by a factor of 30. Since about 85 percent of the economic benefits are attributable to the preventions of over 230,000 early deaths in 2020, we should feel confident that aerosol research is truly significant.

Read the full report at: <http://www.epa.gov/air/sect812/prospective2.html>

Coarse Particulate Matter (CPM) Varies Significantly Across a Region

Lack of understanding of human exposure to CPM across a region has impeded the advancement of studies of its health effects. To address this question, Costas Sioutas and his coworkers performed measures of CPM and its composition at ten sites in and around Los Angeles. The analysis of one year of data for hourly coarse particulate matter (CPM, PM_{10-2.5}) concentrations at three different sites in the Los Angeles region provides insight into the challenge of exposure assessment to CPM. Significant variation exists in both the mean hourly concentrations (from less than 5 µg m⁻³ to near 70 µg m⁻³) and the diurnal profiles at each site. While the CPM concentrations in this region can generally be explained by wind-induced road dust re-suspension, it is clear that short term CPM exposure assessment must rely on very nearby monitors or some model incorporating understanding and variation of sources.

(K.F. Moore, et al., *Aerosol Sci. Techno.*, 2010, 44(7): 526 - 540.)

<http://www.informaworld.com/smpp/content~content=a922935743~db=all~jumptype=rss>

New Method to See Air Pollution Effects

Sara Adar and the research team working on the Multi-Ethnic Study of Atherosclerosis and Air Pollution (MESA Air) have recently published results using a novel in vivo approach for measuring the impact of air pollution on the human microvasculature. MESA Air is a ten-year prospective epidemiology study aimed at investigating the cardiovascular health effects arising from long-term exposure to fine particle pollution (PM2.5). The new technique uses digital retinal images to estimate the retinal vessel diameters - these tiny blood vessels were narrower in persons residing in areas with higher levels of PM2.5. These findings support the hypothesis that important vascular phenomena, and the subsequent development of cardiovascular disease, are associated with exposure to aerosol particle air pollution, and further corroborate reported associations between air pollution and the development and exacerbation of clinical cardiovascular disease.

(S.D. Adar, et al. *PLoS Med.*, 2010, 7(11): e1000372.)

<http://www.ncbi.nlm.nih.gov/pubmed/21152417>

Aerosol Instrument Intercomparison

Extremely rich and informative data sets result from field studies, especially those involving multiple overlapping measurement techniques. A recently published paper by Docherty et al. gives an overview of the instruments used and the measurements made in the 2005 Study of Organic Aerosols at Riverside (SOAR-1) campaign. The focus of this study is to improve understanding of the sources and composition of fine particulate matter in the inland Los Angeles region, where organic aerosol accounts for roughly one third of the fine particulate matter. The strength and value of this work is the demonstration of how results from multiple techniques compare. For example, the organic carbon from a high-resolution aerosol mass spectrometer compares reasonably well with data from Sunset semi-continuous instruments, although there is substantial scatter. See the full paper for all of the details:

(K.S. Docherty, et al., *Atmos. Chem. Phys. Discuss.*, 2011, 11: 6301-6362.)

<http://www.atmos-chem-phys-discuss.net/11/6301/2011/acpd-11-6301-2011-discussion.html>

RESULTS YOU CAN COUNT ON

I We've Bridged the Gap!

The 3340 Laser Aerosol Spectrometer bridges the 1 micron particle sizing gap. With an attractive size range of 0.09 – 7.5 μm , excellent sizing precision, and a powerful on-board PC, the 3340 is a valuable addition to your aerosol tool kit.

- TSI's Laser Aerosol Spectrometer - Model 3340
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E-mail: particle@tsi.com Web: www.tsi.com/webinars

Important Announcements

Students

Travel grant and student assistant applications will be taken until July 15th (or until we receive enough assistants). Please see the "Student Programs" tab at the top of the conference web site.

Full Members

You have until Friday, July 15 to cast your vote for the leaders of AAAR. Please contact Deanna Bright - dbright@ahint.com - for more information.

Other Aerosol Meetings

August 1-5, 2011

2nd Conference of the Brazilian Association for Aerosol Research
Pontifical Catholic University at Rio de Janeiro (PUC-Rio), at Gavea
www.brazilaerosol.org

August 14 - 19

Goldschmidt 2011
Prague, Czech Republic
www.goldschmidt2011.org
Abstract deadline: April 15th

September 12-13, 2011

EPRI-A&WMA Workshop on Future Air Quality Model Development Needs
DoubleTree By Hilton Hotel
Arlington, Virginia, USA
<http://www.awma.org/Core/Events/eventdetails.aspx?iKey=S136310>

September 13-16, 2011

International Society for Environmental Epidemiology
Palau de Congresos de Barcelona in Plaza d'Espanya
Barcelona, Spain
www.isee2011.org

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