

# PARTICULARS

The E-Newsletter of the American Association for Aerosol Research

SUMMER 2017

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

Simply email [info@aaar.org](mailto:info@aaar.org) with the subject line '*Particulars*'

**Jeff Pierce**, Editor

## President's Message

*Dear Fellow AAAR Members,*

I welcome you to the summer 2017 edition of *Particulars*. The ballot for the election of new officers, board members and working group chairs will be sent out shortly from the central office. I encourage everyone to take the time to vote. It just takes a minute.

I encourage your continued and strengthened involvement in AAAR. Volunteer activities don't require special expertise. How can you become more involved? Sometimes it is just a matter of saying "yes" when asked. You can also take proactive steps. Go to our website ([www.aaar.org](http://www.aaar.org)) and visit the "**About AAAR**" and "**Members Only**" tabs to learn more about the structure and operation of our association. Update your members profile with information on which committees you would like to serve on. Become involved in the working group most closely aligned with your interests. Tell your senior colleagues that you are interested to become more involved in AAAR and ask for advice about opportunities to pursue.

As my year serving as President comes to a close, I would like to take this opportunity to thank the AAAR community. It is you, the scientists who work tirelessly to pursue knowledge and effect change, who are the foundation of our community. You make possible, through your individual pursuits, the larger direction and purpose of the field. AAAR does an excellent job of fostering the kinds of relationships that are so integral to maintaining a healthy, active scientific community, and it has been rewarding to help with this mission. Have a happy and productive summer. ●

Sincerely,

**Allen Robinson**, AAAR President

**American Association  
for Aerosol Research (AAAR)**

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## 2017 Annual Conference Update

By **Nicole Riemer**, 2017 Conference Chair

I look forward to seeing many of you at the **36th AAAR Annual Conference**, which will be held at the Raleigh Convention Center in Raleigh, North Carolina, from **October 16-20, 2017**. The program will follow our usual format, with tutorial sessions on Monday, an exhibition from Tuesday through Thursday, and poster and platform presentations from Tuesday morning through Friday noon. This year's outstanding list of plenary speakers includes **Andrea Ferro** (Clarkson University), **Markus Kraft** (Cambridge University), **Joel Thornton** (University of Washington), and **Vicki Grassian** (Scripps Institute of Oceanography). On Wednesday morning at 6:30 a.m. we will have a 5K group run/walk. On Thursday afternoon, we have arranged for technical tours to the Environmental Protection Agency laboratories. You can sign up for these events when registering for the conference.

In addition to a full slate of topical sessions, we will have five special symposia designed to bridge multiple topical areas and promote cross-disciplinary interaction:

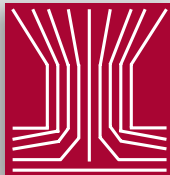
- **There Must be Something in the Water: Cloud, Fog and Aerosol Aqueous Chemistry for Aerosol Production**
- **Passive Mitigation Strategies to Reduce Exposure to Near-Road Air Pollution**
- **Linking Aerosol Oxidative Potential with Chemical Composition and Biological Endpoints**
- **Extraterrestrial Aerosols: From Mars to Titan and Beyond**
- **Regional and Global Air Quality and Climate Modeling**

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

<http://aar.org/2017/>

Those of you who submitted your conference abstracts before the May 5 deadline should already have a poster or platform assignment for your presentation listed in the preliminary technical program, posted online at:

<http://www.aarabstracts.com/2017/program.php>



# 36<sup>th</sup> AAAR

## ANNUAL CONFERENCE

**OCTOBER 16-20, 2017**

RALEIGH CONVENTION CENTER  
RALEIGH, NORTH CAROLINA

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If for any reason you cannot present your paper, please contact us immediately via e-mail at:

[support@aaarabstracts.com](mailto:support@aaarabstracts.com)

This will minimize the number of corrections to the program once it goes into print.

Abstracts submitted between **May 5** and the late breaking poster submission deadline of **July 28** will be added to the conference program in early August. **July 28** is also the **early registration deadline**—by registering for the conference before that date you will pay the lowest possible registration fee. Students (and their advisors) should check the web site for student travel grant information—these applications will be due **July 31**. All registrants this year will have free access to the **AAAR Conference Mobile App** with all conference details.

The conference venue, the Raleigh Convention Center, is located near downtown, close to many excellent restaurants. Raleigh is also home to several acclaimed parks and a vibrant museum scene, including the Museum of Natural Sciences, the North Carolina Museum of Art, and the North Carolina Museum of History.

A conference block of reduced rate rooms has been secured at the Marriott Raleigh City Center and the Sheraton Raleigh Hotel. Room **reservations** in the AAAR room block must be made no later than **September 15, 2017**. 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:

<http://aaar.org/2017/>

Thanks to all of the working group chairs, symposium organizers, and others who have worked hard to put together an outstanding 2017 conference. ***I look forward to seeing you there!*** •

RALEIGH, NORTH CAROLINA



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# AS&T Article Highlight

By Jason D. Surratt

## Computer-Controlled Raman Microspectroscopy (CC-Raman): A Method for the Rapid Characterization of Individual Atmospheric Aerosol Particles

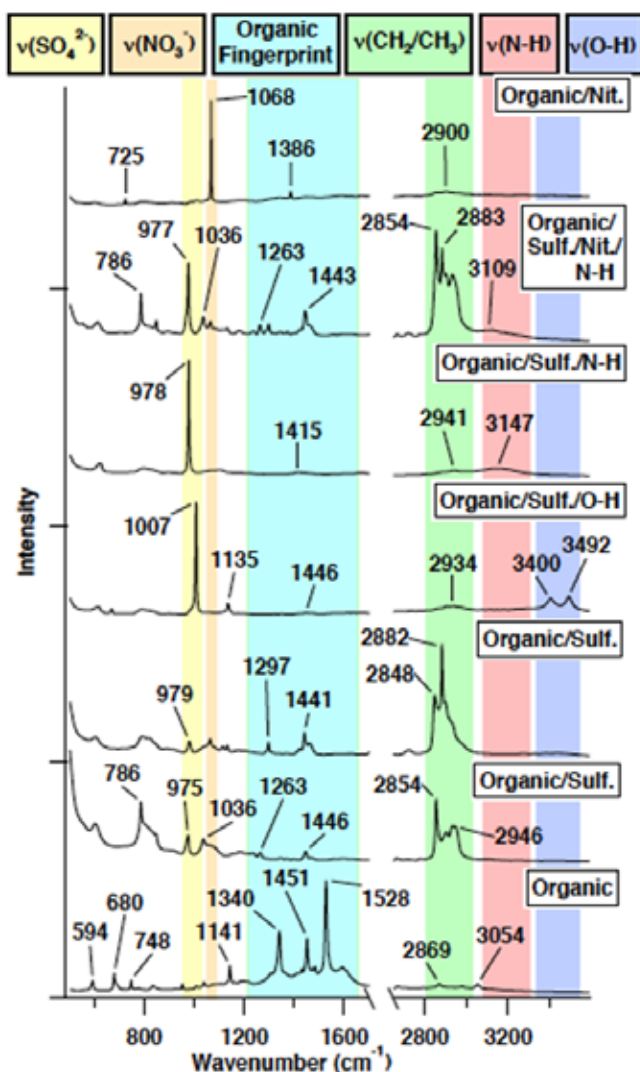
Rebecca L. Craig, Amy L. Bondy, and Andrew P. Ault

*Aerosol Science and Technology*

DOI:10.1080/02786826.2017.1337268

In this study, Craig et al. demonstrate a new method, computer-controlled Raman microspectroscopy (CC-Raman), for automated single particle aerosol analysis. Specifically, the method is demonstrated for laboratory-generated aerosol model systems and ambient aerosol samples collected during the 2013 Southern Oxidant and Aerosol (SOAS) study. Notably, CC-Raman maximizes the potential for Raman microspectroscopy to provide detailed chemical composition and size

for a representative population of aerosol particles, especially in terms of identifying constituents in secondary organic aerosol (SOA) particles and in other organic-containing particles. As an example for the potential of CC-Raman, the authors analyzed 1391 particles from six different samples collected during the 2013 SOAS field study in Centerville, AL. This analysis yielded clusters of trace organic particles, organic particles, organic/mineral mixed particles, particles containing graphitic soot, and particles that exhibited fluorescence (shown in Figure 5 from this study). The organic cluster, which was ~ 25% of the particles detected during SOAS, was composed of many particles with diverse and unique spectra. As seen in the example spectra shown in the Figure attached here (Figure 6 from the main text), these organic cluster particles contained  $\nu(\text{SO}_4^{2-})$ ,  $\nu(\text{NO}_3^-)$ ,  $\nu(\text{N-H})$ , and  $\nu(\text{O-H})$  stretching



*Example Raman spectra of the fingerprint region (<math><1600\text{ cm}^{-1}</math>) and higher energy region (2700-3600 <math>\text{cm}^{-1}</math>) of the particle types identified within the organic class of SOAS aerosol particles. Each spectrum was normalized to the highest intensity peak.*

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modes, as well as a variety of modes in the organic fingerprint region and different combinations of  $\nu(\text{CH}_2/\text{CH}_3)$  symmetric and asymmetric stretching modes. In the organic fingerprint region, the vibrational modes are difficult to identify with certainty due to the many different functional groups that exhibit Raman activity within that spectral window; however, based on functional groups common to SOA, such as carboxylic acids, long-chain aliphatics, fatty acids, and organonitrates, these vibrational modes are likely stretching modes, such as  $\nu(\text{C-C})$ ,  $\nu(\text{C=C})$ ,  $\nu(\text{C-O})$ ,  $\nu(\text{CO}_2^-)$ , and  $\nu(\text{C-OH})$ , and bending, wagging, and rocking modes, such as  $\delta(\text{CH}_2/\text{CH}_3)$ ,  $\delta(\text{C-C})$ ,  $\delta(\text{O-H})$ , and  $\delta(\text{O-C-O})$ . Due to its ability to probe secondary species and properties of particles that other single particle techniques struggle to measure, CC-Raman can also be used to answer questions regarding organic and inorganic molecular species present in aerosol particles, aging of particles, and mixing of secondary species with primary constituents. Other advantages of CC-Raman include being able to conduct analysis at ambient temperature and pressure as well as only needing limited sample preparation. CC-Raman as a stand-alone method or in combination with other techniques will likely help to answer important questions about the sources and fates of aerosol particles in our environment. ●

## In Case You Missed It

By Kristina Wagstrom

### Aerosols and Low-Level Marine Clouds.

This summer and next winter scientists from the U.S. Department of Energy will undertake detailed flight studies off the Eastern North Atlantic. This study specifically focuses on improving the understanding of how aerosols impact low-level marine clouds to improve model representations.

<https://www.bnl.gov/newsroom/news.php?a=112138>

### More Bad News about Wildfires.

Recent work from a multi-university and multi-agency collaboration has measured substantially, up to three times, higher ultrafine aerosol concentrations in wildfire plumes that current emissions inventories would suggest. The discrepancy likely results because EPA used measurements taken during controlled, prescribed burns to develop the current inventories.

Liu, X., et al. (2017), Airborne measurements of western U.S. wildfire emissions: Comparison with prescribed burning and air quality implications, *Journal of Geophysical Research—Atmospheres*, 122.

DOI:10.1002/2016JD026315

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### Each Sea Spray Aerosol Particle Is Unique.

In a detailed analysis of sea spray produced in an experimental ocean, researchers identified distinct differences in both the individual aerosols produced and aerosols produced during different stages of phytoplankton and bacterial life cycles.

Cochran, R.E. et al. (2017), Molecular Diversity of Sea Spray Aerosol Particles: Impact of Ocean Biology on Particle Composition and Hygroscopicity, *Chem*, 2 (5), pp. 655-667.

DOI: 10.1016/j.chempr.2017.03.007

### Air Pollution Lowers Carbon Absorbing Ability of Plants in China.

A recent study led by researchers at the University of Exeter suggests that damage to plants from ozone substantially decreases the plant's ability to absorb carbon during photosynthesis.

Yue, X. et al. (2017), Ozone and Haze Pollution Weakens Net Primary Productivity in China, *Atmospheric Chemistry and Physics*, 17, pp. 6073-6089.

DOI:10.5194/acp-17-6073-2017 •

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## Aerosol Scientist Spotlight: Tyler Beck

By Kristina Wagstrom

### 1.) How did you get involved in the aerosol science community?

It all started when I returned to school after interrupting my studies for a 10 year hiatus in Alaska. Prior to the break I had been studying physics and worked in a high energy physics department helping build and install particle detectors at Fermilab. Now I was returning to a new school, the University of Minnesota, and had changed my major to mechanical engineering. One of the first days there I happened to walk by a door marked "Particle Technology Laboratory" and wondered why it was in the mechanical engineering department rather than physics. I decided to go in and find out and soon found myself helping build aerosol particle detectors.

### 2.) Which people in our field have influenced you the most?

I have been fortunate to have worked and interacted with many wonderful people in many different disciplines within the aerosol research field over the last 28 years. Ben Liu was my first aerosol

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physics instructor, he told me aerosols were a black hole that I would never escape and he was right. Pat Keady gave me my first job in aerosols, hiring me fresh out of school as an application engineer for TSI. But it is Gil Sem to whom I owe the most. He was my boss and mentor for many years at TSI and taught me the aerosol instrumentation business.

### 3.) As the next president of AAAR, where do you see the association headed?

I see the AAAR headed in pretty much the same direction it has been going since I first joined in 1992, and that is a good thing. It heartens me that as the pioneers of this field are retiring there are plenty of bright, energetic people stepping forward to give their time and energy to the association. I don't see any need to try to be any more than what our purpose statement says "a nonprofit professional organization for scientists and engineers who wish to promote and communicate technical advances in the field of aerosol research".

### 4.) What future directions are you particularly excited about pursuing?

I personally would like to continue efforts to archive as much of the annual conference as possible. It always seemed a shame to me how much knowledge was lost each year, especially many of the poster presentations which deal with topics too narrow to ever be part of a peer reviewed paper. •

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## Student Chapter Highlights

By Jeff Pierce

### Carnegie Mellon University:

The CMU AAAR student chapter hosted the **5th Annual Donora Lecture** to commemorate the **1948 Donora Smog**. The speaker **Prof. Jose Jimenez** talked about "Constraining Organic Aerosol Sources and Properties from the Lab to the Global Atmosphere". Members are heavily involved in a new research center established in CMU (Center for Air, Climate, and Energy Solutions), methane measurement, CLOUD CERN chamber experiments, and biomass burning campaigns.

### Charles University in Prague:

Charles University AAAR Student Chapter members **developed educational experiments** for bachelor's students. These experiments were simulated temperature inversion layer in a glass tube, fume droplet formation in particle-free box, and measurements of vertical temperature

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## Organizational Members

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



profiles by tethered balloon. Students also made a **public lecture** on air pollution at an elementary school, actively participated in the AAAR conference, and continue with beekeeping on the university campus.

### Colorado State University:

Every Fall, the Colorado State AAAR chapter helps to host the annual **Young Scientists Symposium on Atmospheric Research**, an annual research symposium open to students and post docs along the Colorado Front Range. Currently, we are planning an independent research project to measure personal PM exposure associated with campfire smoke, building on a pilot study conducted by one of our members. We are also hosting fundraising barbecues to raise money for a local charity and volunteering as part of an **“adopt-a-trial” program** with the US Forest Service.

### University of Florida:

The UF AAAR Student Chapter helped host an **Air Quality Seminar** for students to present their research to their peers, professors, and local air quality professionals. Lab tours were given to local high school students to provide aerosol knowledge.

### University of California, Riverside:

Members of the UCR Student Chapter have been academically and socially engaged this year. Several attended the **34th Informal Symposium on Kinetics and Photochemical Processes in the Atmosphere** in San Diego and the March for Science in Los Angeles this spring. Earlier this year in Riverside, members attended a lunch with **Dr. Pratim Biswas** and hosted a pizza and movie night featuring **Dr. Doug Worsnop’s Aerosol History** interview.

### University of Cincinnati:

The Cincinnati AAAR Student Chapter hosted **Drs. Susanna** and **Carla Viegas**, Professors in the Lisbon School of Health Technology, Lisbon, Portugal, for special seminars on “Exposure to fungi in highly contaminated occupational settings” and “Aspergillus spp. prevalence in different Portuguese occupational environments” by Dr. Carla Viegas and “Occupational exposure to mycotoxins – aspects to consider for the risk assessment process” by Dr. Susana Viegas. In addition, our chapter hosted **Dr. Marko Hyttinen**, a scientist in the Department of Environmental Health and Biological Sciences at the University of Eastern Finland, for a special seminar on “Working Conditions and Risk Assessment of Cleaning”.

### Washington University in St. Louis:

The AAAR student chapter at Washington University in St. Louis **organized social events and technical workshops** with university faculty, distinguished visitors, and students within the chapter to discuss a wide range of topics such as personal research biographies, organization of government funding agencies, programming and data acquisition, and fundamentals of light scattering. ●