Brazilian Association for Aerosol Research
Associação Brasileira para Pesquisa de Aerossol

2nd Conference, August 1-5, 2011
Pontifícia Universidade Católica do Rio de Janeiro (PUC)
Gávea, Rio de Janeiro, RJ, Brazil

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Session Chairs

We would like to give special thanks to the following people who will be chairing the working sessions.

Monday – August 1

10:45-12:15	Instrumentation 1: Peter McMurry (Chair) and Susanne Hering (Co-Chair) Emissions: Allen Robinson (Chair) and Sulekha Chattopadhyay (Co-Chair)
3:15-4:45	Instrumentation 2: Richard Flagan (Chair) and Tim Johnson (Co-Chair) Aerosol Chemistry 1: Paulo Artaxo (Chair)

Tuesday – August 2

10:15-11:45	Aerosol Modeling: Donald Dabdub (Chair) and Fatima Andrade (Co-Chair) Urban/Regional/Global Aerosols 1: Andrew Allen (Chair) and Antonio H. Miguel (Co-Chair)
2:45-4:15	Aerosols, Clouds and Climate: Maria Yamasoe (Chair) and Rahul Reddy (Co-Chair) Urban/Regional/Global Aerosols 2: Renato P. Camata (Chair) and Adalgiza Fornaro (Co-Chair)

Wednesday – August 3

10:45-1:10	Aerosol Chemistry 2: Allen Goldstein (Chair) and Arantzazu Eiguren-Fernandez (Co-Chair)

Thursday – August 4

10:15-11:45	Health Effects: Nelson Gouveia (Chair) and Simone G.E. K. Miraglia (Co-Chair)
2:45-3:55	Microenvironments and Bioaerosols: Benigno Sanchez (Chair) and Sergio Machado (Co-Chair)

Friday – August 5

10:15-11:45	Aerosols and Environment: Jose Marcus Godoy (Chair) and Darrel Baumgardner (Co-Chair)

Student Assistants

BAAR would like to acknowledge the 2011 Student Assistant Volunteers.

- Camila Nunes
- Monique Curcio
- Ivan Hetem
- Eva Margarita Melgar Paniagua
- Marina Dos Santos
- Fernando Santos
- Leticia Caetano
- Ruth Evelyn souza
- Vitoria Pereyra

Tutorials

In addition to regular sessions, tutorials with particular focus will be facilitated by leaders in the field of aerosol science and engineering. These will run 90 minutes in duration.

Tutorials will run in parallel, all on Wednesday, August 3, from 2:00 to 3:30 pm.

Diesel Engine Emissions Control
Antonio H. Miguel, *The Huntington Botanical Gardens, San Marino, CA*

Abstract: This tutorial summarizes the key developments in diesel emission control. Examples from the spectrum of technologies will be presented, including diesel NOx control developments on selective catalytic reduction (SCR), lean NOx traps (LNT) and lean NOx catalysts (LNC), along with important developments on diesel particulate filters (DPFs), and oxidation catalysts.

Biographical Sketch: Antonio H. Miguel completed his PhD in the Chemistry Department, University of Illinois Urbana-Champaign in 1976, followed by post-doctoral work in Environmental Engineering Science at Caltech in 1976 and 1977. He was inducted as a member of Phi Lambda Upsilon Honorary Chemical Society and received the Granite City Steel Company Prize in Environmental Chemistry (1974-1975) for his thesis work. Since 2008, Dr, Miguel has been volunteering at the Huntington Botanical Gardens, San Marino, Ca, where he also conducts tours, as docent, in the European Art Gallery. Currently Dr. Miguel is an air pollution specialist at the California EPA - ARB Haagen-Smit Laboratory in El Monte, CA. His research focuses on aerosol measurement and behavior. For over a decade he has also been interested in the development of in situ methods for measuring physical and chemical properties of complex aerosol particles, such as found in Secondary Organic Aerosol (SOA).

Aerosol Science and Technology in Materials Synthesis
Renato P. Camata, *Centro de Engenharia, Modelagem e Ciências Sociais Aplicadas, Universidade Federal do ABC, Santo André, SP and Department of Physics, University of Alabama at Birmingham, Birmingham, AL, USA.*

Abstract: Aerosol science and technology provides a flexible platform for materials fabrication. Aerosol routes are used to synthesize materials in the form of micro- and nanopowders, colloidal suspensions, nanostructured surfaces, and thin films, among others. This tutorial will provide an overview of the broad range of aerosol approaches and techniques used over the past two decades to create materials with applications in fields as varied as catalysis, optoelectronics, and cell biology.

Biographical Sketch: Renato P. Camata completed his Ph.D. at the California Institute of Technology in 1997 and has worked as a researcher at the Institute of Physical and Chemical Research (RIKEN) in Japan and at the Institute of Physics of the University of São Paulo. Dr. Camata's research is focused on the use of laser and aerosol processes in materials fabrication with current projects directed toward synthesis and properties of nanostructured ceramics for biomedical applications and semiconductor thin films for mid-infrared laser sources. He is currently a researcher in the Centro de Engenharia, Modelagem e Ciências Sociais Aplicadas at the Universidade Federal do ABC and a

faculty member in the Department of Physics at the University of Alabama at Birmingham. He also serves as investigator in research projects at the Brazilian Synchrotron Light Source (LNLS).

Ambient Organic Aerosols
Sulekha Chattopadhyay*, Independent Air Quality Professional, Pasadena, California, USA.*

Abstract: Particulate matter is the most easily recognizable form of air pollution since it can be observed, for example as smoke from stacks or dust on surfaces. Quantitative measurements of pollutant particles were apparently first made in the early 1900s. Since the beginning of the Industrial Revolution, global dependence on fossil fuels has resulted in serious air pollution episodes. Atmospheric particulate matter can be classified according to particle sizes. This leads to distinct modes that are a reflection of the emission sources. Organic aerosols having diameters less than 2µm degrade visibility and cause serious respiratory problems in humans. To alleviate these problems it is essential to understand their formation process. This presentation shows the measurement results of thermodynamic properties of aerosol forming compounds.

Biographical Sketch: Sulekha Chattopadhyay received her Ph.D. from the University of California, Riverside, in 2004. She is the recipient of the Dean's fellowship from UC-Riverside. She is also the recipient of Guru Gobind Singh Fellowship for her graduate studies and Rotary International's award during her undergraduate studies. Her interests are, understanding the fate and transport of particulate matter formed from secondary processes. Sulekha has participated in various national and international conferences and chaired several sessions.

Field Studies: Design Considerations for Launching a Successful Campaign
Arantzazu Eiguren-Fernandez, *Research Chemist Aerosol Dynamics, Inc. 935 Grayson Street, Berkeley, CA, USA.*

Abstract: Field campaigns are vital for collecting data that allows us to understand the variables that govern a particular environment, and to build a working model that can be used to assess how the different variables impact target communities.

Our dynamic atmosphere is highly variable and unstable. The study of spatial and temporal variations requires of a careful selection of locations, sampling methods and protocols, and sampling times. Some of the important points to consider when designing a field campaign may include:

- Consideration of the specific goals of the study and the questions that need an answer.
- Development of an effective sampling campaign taking into consideration factors such as: the number of sites and samples to be collected, and the kind of data needed, among others

Also important is the definition of the best method for handling, storing, and especially preservation of the collected samples, as the success or failure of the study may depend on the integrity of the samples prior to analysis.

Biographical Sketch: Arantzazu Eiguren-Fernandez completed her Ph.D. in Analytical Chemistry in 2000, and joined a group of researchers working at the UCLA Southern California Particle Center as a Postdoctoral Researcher. Her research has been focused in characterizing the physical, chemical and toxicological properties of particulate matter and their relation with adverse health effects. Dr.

Eiguren-Fernandez is now working at Aerosol Dynamics and her most recent projects involve the development of new portable field instruments, which are affordable and capable of measuring near- or real-time chemical species present in aerosol particles.

Introduction to Aerosol Mechanics

Richard C. Flagan, *Department of Chemical Engineering, California Institute of Technology, Pasadena, CA, USA.*

Abstract: This course covers basic aerosol mechanics (particle motion) at an introductory level. Topics include the aerodynamics of single particles, Stokes law, settling velocity, slip correction, aerodynamic diameter, non-spherical particles, acceleration, relaxation time, stopping distance, impaction, electrical mobility, and aerosol sampling. We will also discuss the collective behavior of aerosols, e.g., Brownian motion, diffusion, deposition, filtration, condensation, and coagulation, and their effects on particle size distributions. The course covers theory and applications and is suitable for those new to the field and for others who want to brush up on the basics.

Biographical Sketch: Richard C. Flagan is the McCollum/Corcoran Professor and Executive Officer for Chemical Engineering at the California Institute of Technology where he teaches chemical engineering and environmental science. He has served as president of AAAR and editor-in-chief of Aerosol Science and Technology. His research spans the field of aerosol science, including atmospheric aerosols, aerosol instrumentation, aerosol synthesis of nanoparticles and other materials, and bioaerosols. His many contributions to the field of aerosol science have been acknowledged with the Sinclair Award of the AAAR and the Fuchs Award.

Keynote Address

Monday, August 1, 9:30-10:30 am
Aerosol Science and Technology Enabling Energy Applications, PRATIM BISWAS, *Washington University in St. Louis*

Abstract: Aerosol science and engineering is an enabling discipline and has application in a number of areas such as electronics, materials, pharmaceuticals, energy and environment. A subsection of this discipline deals with nanoparticles – the building blocks of nanotechnology.

The presentation will discuss the global challenges of Energy and Environment, and how nanoparticle aerosol science and technology can enable advanced energy technology solutions. The "energy space" can be divided into two parts – the "energy haves" and the "energy have-nots". Both these sectors have equal numbers of people, and are important vis a vis energy and environmental issues. The "energy haves" need to develop strategies for improving energy efficiency; whereas the "energy have nots" have to rely on sustainable energy solutions. The importance of the energy –environmental nexus will be highlighted. Energy technologies applicable over multiple time scales – from current fossil fuel use (e.g., novel modalities in coal combustion), to transitionary bio-fuels production and usage, to sustainable solar energy technologies (novel nanostructured materials) will be discussed. A common theme that will be presented includes the use of aerosol routes for synthesis of nanomaterials, that are now enabling energy applications. Applications of fundamental concepts of aerosol science and engineering that aid in addressing this "global challenge problem" will be discussed.

Biographical Sketch: Professor Biswas is the Chairman of the Department of Energy, Environmental & Chemical Engineering at Washington University in St. Louis. He has more than 200 publications, has presented several invited presentations nationally and internationally and holds four patents. He has won several Teaching and Research Awards including the recipient of the 1991 Kenneth Whitby Award given for outstanding contributions by the American Association for Aerosol Research and the Neil Wandmacher Teaching Award of the College of Engineering in 1994. He was elected as a Fellow of the Academy of Science, St. Louis in 2003.

Professor Biswas has played a leading role at the National and International arena in the field of Aerosol Science and Technology by serving on several National Committees. He was the Conference Chair for the 15th Annual Meeting of the American Association for Aerosol Research, Chair of the Critical Review Committee of the Air and Waste Management Association, an Associate Editor of the Aerosol Science and Technology Journal, and the Technical Program Chair of the 7th International Aerosol Conference in 2006; and served on the Board of Directors of the American Association for Aerosol Research and was the Treasurer in 1998 and President of the organization in 2006-07. Professor Biswas is a member of the Steering Committee of the McDonnell International Scholars Academy, and an Ambassador to the Indian Institute of Technology, Bombay.

Professor Biswas is also the Director of the McDonnell Academy Global Energy & Environment Partnership (MAGEEP) and a member of the Steering Committee for I-CARES (International Center for Advanced Renewable Energy & Sustainability).

Plenary Lectures

Monday, August 1, 2:00-3:00 pm
Tandem Measurements of Aerosol Properties, PETER H. MCMURRY, *Department of Mechanical Engineering, University of Minnesota*

Abstract: Tandem measurement methods involve the use of two or more instruments in series to measure multiple properties of the same particle. Information that can be obtained from tandem measurements allows a more complete description of the physical and chemical properties of morphologically and chemical complex particles than can be obtained from the measurement of only a single property. Examples of tandem measurement methods that we have developed include the tandem differential mobility analyzer (TDMA), DMA-APM (aerosol particle mass analyzer), DMA-MALS (multiangle light scattering), and DMA-ATOFMS (aerosol time of flight mass spectrometer). These measurements allow measurements of properties including density, refractive index, fractal dimension, dynamic shape factor, aerosol mixing states, volatility, hygroscopicity, etc. They also allow for determining the relationships among different measures of particle size, including mobility, aerodynamic, optical, and Stokes equivalent diameters. This lecture will describe these tandem measurement methods and will illustrate the types of information they can provide for diverse types of aerosols.

Biographical Sketch: Peter H. McMurry is the Kenneth T. Whitby Professor of Mechanical Engineering at the University of Minnesota. He completed his Ph.D. at the California Institute of Technology in 1977 and has been at Minnesota since then. His research focuses on aerosol measurement and behavior with a primary focus on atmospheric aerosols. His current work focuses on new particle formation and the development of new in-situ techniques to characterize physically and chemically complex particles. His group invented aerodynamic lenses, which enabled the development of aerosol mass spectrometers, and condensation particle counters that can detect particles as small as 1 nm. His research team has developed several tandem methods for characterizing aerosol particles. He has received several awards, including most recently the 2006 Fuchs Memorial Award and a 2007 Guggenheim Fellowship. McMurry is Editor-in-Chief of Aerosol Science and Technology.

Tuesday, August 2, 9:00-10:00 am
Chemical & Physical Modeling of Aerosols, DONALD DABDUB, *University of California, Irvine*

Abstract: The dynamics of the atmosphere involve several complex nonlinear chemical processes coupled to numerous physical processes. Field studies and satellite observations are extremely important. Nevertheless, they only provide a snapshot of atmospheric conditions at a given time and location. Laboratory studies focus on an understanding of individual phenomena. To comprehend the behavior of the atmosphere as a whole, mathematical models are among the best tools available. This talk presents an overview of the history and evolution of the mathematical techniques used to predict aerosol dynamics within atmospheric models. Then, a description of some of the present day challenges related to chemical and physical modeling of aerosols is presented. Finally, the talk discusses most recent model studies performed using the UCI-CIT airshed model for the South Coast Air Basin of California that explore the impact of semi-volatile organics not attaining equilibrium between the gas and particle phases. Results suggest that the SOA

generated from the NO2 + O3 + alpha-pinene system might not be liquid, consistent with recent published work from other laboratories. Implications for the current discrepancies between model predictions and field measurements of SOA are elaborated.

Biographical Sketch: Donald Dabdub is a Professor of Mechanical and Aerospace Engineering and Professor, Advanced Power and Energy Program at the University of California, Irvine. He completed his Ph.D. in Chemical Engineering at the California Institute of Technology in 1995. Dr. Dabdub's expertise is in mathematical modeling of air pollution dynamics and numerical algorithms using high performance parallel computation. His main research effort is to develop new physics and chemistry for air quality models, to design new algorithms for the numerical solution of the governing equations of air pollution dynamics, and to study the impact of various energy-related scenarios on urban airsheds. He presented the Schiesser distinguished lecture at Lehigh University. Furthermore, he was awarded the Prometheus Teaching award for excellence at the University of California, Irvine. Outside of academia, Dr. Dabdub has served as advisor to various state and federal agencies including: The Air Resources Board of California, John Wayne Airport, Lake Tahoe Science Consortium and the U.S. Environmental Protection Agency.

Tuesday, August 2, 1:30-2:30 pm

Climatic effects of aerosols in Amazonia, PAULO ARTAXO, Luciana Rizzo, Kenia Wiedemann, Samuel P. Camara, Melina Paixão, Samuel P. Camara, Micael Cecchini, Andrea Arana, Silvia Lucca, *Institute of Physics, University of São Paulo*

Abstract: Aerosol particles are a critical ingredient in the functioning of Amazonian ecosystem. It control cloud properties, radiative balance, nutrient cycling and other important ecosystem functions. In terms of radiative forcing, aerosols from biomass burning can provide a negative forcing of -300 watts/m2, instantaneously, with an average of 7 years of -38 watts/m2. This is very high forcing, and has important impacts on carbon uptake by the ecosystem. Aerosols increase the diffuse radiation and plants make photosynthesis more efficiently in forests with larger fraction of diffuse radiation. For high amounts of aerosols, photosynthesis is basically shut down. Aerosols from biomass burning also makes efficient cloud condensation nuclei that alters could microphysics very significantly. It was observed an increase in cloud cover from 25 to 60% when aerosol loading increases the Aerosol Optical Depth (AOD) from 0.1 to 0.7.

We will report long term detailed aerosol measurements 2008 to 2011 as part of the FAPESP AEROCLIMA (Direct and indirect effects of aerosols on climate in Amazonia and Pantanal) project. The dataset obtained encompass the first long term aerosol measurements ever performed in Amazonia, elucidating the differences between the biogenic aerosol population naturally released by the forest metabolism and the anthropogenic aerosols brought to the ecosystem by outer sources as well as regional biomass burning emissions. These data helps to link climatic effects of aerosols with optical, chemical and physical measurements.

Biographical Sketch: Paulo Artaxo is a professor of atmospheric physics at the University of São Paulo. His interests are in physical and chemical properties of aerosols from background regions, as well as urban air pollution studies. Paulo focus also on aerosol-cloud interactions as well as aerosol radiative forcing and biogeochemistry. He is a lead author of the IPCC AR5 report chapter on aerosols and clouds. He was a lead author on the IPCC radiative forcing chapter of AR4.

Wednesday, August 3, 9:00-10:00 am
Known and Unexplored Organic Constituents in the Earth's Atmosphere: Instrument Development to Enhance Exploration, ALLEN GOLDSTEIN, *University of California at Berkeley*

Abstract: A substantial fraction of the atmospheric organic chemicals in both gas and particle phases have not been, or have very rarely been, directly measured. Even though our knowledge of them is limited, these compounds clearly influence the reactive chemistry of the atmosphere and the secondary formation, transformation, and likely the climate impact of aerosols. A continuing challenge in the coming decade of atmospheric chemistry and aerosol research will be to elucidate the sources, structure, chemistry, and fate of these clearly ubiquitous yet poorly constrained organic atmospheric constituents. Critical questions include: What atmospheric organic compounds do we know about and understand? What organic compounds are present as gases and in aerosols? What evidence exists for additional organic compounds in the atmosphere? How well do we understand the transformations and fate of atmospheric organics?

The complex chemical composition of atmospheric aerosols, particularly the organic carbon portion, presents unique measurement challenges. We developed the Thermal Desorption Aerosol Gas chromatograph (TAG) system for hourly in-situ speciation of a wide range of primary and secondary organic compounds in aerosols. This instrument combines a particle collector with thermal desorption followed by gas chromatography and mass spectrometric detection to provide separation, identification, and quantification of organic constituents at the molecular level. Observed compounds include alkanes, aldehydes, ketones, PAHs, monocarboxylic acids, and many more. The hourly time resolution measurements provided by TAG capture dynamic and frequent changes in aerosol composition. Recently, we have incorporated a two-dimensional chromatography (GC×GC) capability into TAG with a time of flight (TOF) MS detector. Two-dimensional chromatography provides two types of compound separation, most typically by volatility and polarity using two columns with different stationary phases connected in series separated by a modulator. The modulator periodically traps analytes eluting from the first column, and injects fractions of this effluent onto the second column in the form of narrow pulses providing additional separation for co-eluting peaks. The approach is especially useful for distinguishing polar compounds that would otherwise be buried in the unresolved complex. We are developing a semivolatile collection system that allows simultaneous measurement of chemically specific semivolatile organics in the gas and particle phases, enabling in-situ analysis of speciated organic partitioning in the real atmosphere. We have also developed and deployed a combined TAG-AMS (Aerosol Mass Spectrometer) instrument for simultaneous measurements of the total and speciated aerosol composition. This talk will review our latest developments (TAG, 2DTAG, SVTAG, TAG-AMS), and present new observations of speciated semi-volatile separations between the gas and particle phases, 2DTAG and TAG-AMS observations in ambient air and controlled chamber source oxidation studies.

Biographical Sketch: Allen H. Goldstein has been at the University of California at Berkeley since 1996 where he is a Professor of Biogeochemistry in the Department of Environmental Science, Policy, and Management, and the Department of Civil and Environmental Engineering. He is also a core member of the Berkeley Atmospheric Science Center, and a Faculty Chemist at Lawrence Berkeley National Laboratory United States Department of Energy. He completed his Ph.D. at Harvard University in the Department of Chemistry in 1994. His research focuses on air pollution and the interaction between biogenic volatile organic compounds (VOC) emissions and anthropogenic

pollution to form ozone and aerosols. Goldstein's research addresses these issues through novel instrument development for in-situ observations of organic gases and aerosols, field measurements in urban, rural and remote environments, controlled laboratory experiments, and the use of models and remote sensing data on scales ranging from urban to global. Among other activities and awards, Goldstein has served as Chair in the Department of Environmental Science, Policy, and Management at UC Berkeley, is on the Steering Committee for the International Global Atmospheric Chemistry (IGAC) Program, was a Senior Fulbright Scholar in Australia 2005-6, a Miller Institute Research Professor 2010-11, and was elected a Fellow of the American Geophysical Union in 2011.

Thursday, August 4, 9:00-10:00
Health effects of ambient air pollution, NELSON GOUVEIA, *Departamento de Medicina Preventiva – Faculdade de Medicina da USP*

Abstract: Numerous scientific evidences have indicated that exposure to air pollution, with special emphasis on particulate matter and ozone, can affect human health, and these effects are more significant in the most vulnerable population subgroups such as the elderly and children. It is estimated that about 800.000 deaths worldwide occur annually due to acute and chronic effects of air pollution. Besides the traditional effects on respiratory and cardiovascular system, in the past decades there has been growing interest in the scientific community to investigate the possible effects of air pollution on perinatal health, including fetal growth, duration of pregnancy, congenital abnormalities and mortality. In this lecture we will present the latest evidence on the effects of air pollution on health, identifying the most harmful components of the pollution mixture, the mechanisms of action in the human body, as well as new research trends in this area.

Biographical Sketch: Nelson Gouveia received a degree in Medicine from the Federal University of São Paulo, Brazil and an MSc in Epidemiology and a PhD in Public Health from the London School of Hygiene and Tropical Medicine of the University of London, UK. He is currently an Associate Professor at the Department of Preventive Medicine of the University of São Paulo Medical School where he teaches basic epidemiologic methods to graduate medical students and environmental epidemiology to post-graduate students. His research interests includes a wide variety of environmental exposures and its health effects such as ambient air pollution and electromagnetic fields from power lines, and the utilization of geographic information systems (GIS) for exposure modeling in environmental epidemiology. In addition, he is particularly interested in the application of results from epidemiologic studies in the public health policy arena.

Thursday, August 4, 1:30-2:30 pm
Pulmonary Health Effects of Air Pollution: Particulate Matter and Allergic Arway Inflammation, NING LI, *University of California Los Angeles*

Abstract: Airborne particulate matter (PM) exposure is one of the major risk factors for increased respiratory morbidity and mortality in urban environment. Epidemiological evidence has indicated that there is a close association between PM and the prevalence of allergic diseases such as asthma. Among PM of different sizes, ultrafine particles (UFP) are far more dangerous to human health than larger particles. Due to their small size and large surface area, UFP have great ability to carry a large amount of organic chemicals and deposit them in the lung. Many of the organic chemicals on UFP surface are capable of generating reactive oxygen species (ROS) and causing cellular oxidative stress, which may lead to inflammation and cell death. PM contributes to the pathogenesis and

exacerbation of allergic airway inflammation through its pro-allergic and pro-inflammatory effects. One of the mechanisms is that PM can act as an adjuvant to enhance allergic sensitization to common allergens by targeting dendritic cells, the major antigen presenting cells in the immune system. Another potential mechanism is that PM (e.g. ambient UFP) can boost the secondary immune response during allergen re-exposure, resulting in a more profound inflammatory response deep in the lung. Experimental evidence has suggested that these effects are closely correlated to particles' organic chemical contents and oxidant potential. Taken together, these findings may explain the importance of vehicular traffic on the pathogenesis and exacerbation of allergic airway inflammation, especially in urban settings, and provide an insight to developing preventive and therapeutic strategies for air pollution-related allergic airway diseases (e.g. asthma and allergic rhinitis).

Biographical Sketch: Dr. Ning Li received her Ph.D. in Pathology and Laboratory Medicine from University of Wisconsin-Madison. She started her work at UCLA as a postdoctoral fellow in Dr. Andre Nel's laboratory in the Department of Medicine, Division of Clinical Immunology and Allergy. Currently, she is an Associate Researcher in the Department of Medicine/Division of NanoMedicine at UCLA. Her early work focused on using cellular models to identify the mechanisms by which particulate air pollutants exert their adverse biological effects with an emphasis on the role of oxidative stress generated by particle-associated organic chemicals. In the last few years, she has been working on using animal models to study how pro-oxidative ambient particulate pollutants interfere with immune response to common allergens and exacerbate allergic airway inflammation such as asthma.

Friday, August 5, 9:00-10:00 am

Study of the Radiative Effect of Smoke in the Southwestern Portion of the Amazon Basin, MARCIA AKEMI YAMASOE, Nilton Manuel Évora do Rosário, Renato Kerches Braghiere, Bianca Lobo Silva, *Instituto de Astronomia, Geofísica e Ciências Atmosféricas – USP*

Abstract: During the dry season, large amount of aerosol particles is emitted to the atmosphere in the Amazon Basin. Those particles interact with solar radiation through scattering and absorption processes. Both processes reduce the amount of solar irradiance reaching the surface, while the absorption process can heat the aerosol layer and the scattering process can increase the diffuse fraction of solar radiation. The objective of this talk is to present results of a field experiment conducted in the Southwestern portion of the Amazon Basin during the dry season of 2007 (from 24 August to 29 October), at Reserva Biológica do Jaru (-10,19°; -61,87°), a region surrounded of primary rainforest. Measurements of photosynthetically active radiation (PAR) and global and diffuse broad and narrowband irradiance were conducted. PAR measurements were performed at 7 levels inside the canopy. Additional measurements are continuously performed at a 67m height micrometeorological tower to estimate turbulent sensible and latent heat and CO2 fluxes. From the narrowband data, aerosol optical depth was retrieved and during the field experiment, values higher than 2.0 were frequently observed at channel around 670 nm. Reduction of surface turbulent fluxes was observed due to the presence of smoke, although latent heat flux decreased more slowly, thus, evaporative fraction was higher in smokier or cloudier conditions compared to clear sky conditions. Another result is that the smoke layer reduced the frequency of occurrence of sun flecks due to the attenuation of the direct component of the solar radiation and affected the fraction of absorbed PAR by the vegetation.

Biographical Sketch: Marcia A. Yamasoe completed her Doctorate in 1999 in the Institute of Physics, University of São Paulo. In 2001 she spent six months at NASA Goddard Space Flight Center as a post-doc at the Climate and Radiation Branch. Currently she is a faculty member of the Institute of Astronomy, Geophysics and Atmospheric Sciences, University of São Paulo where she studies aerosol optical properties emitted by biomass burnings in the Amazon basin. The main focus of her work is the impact on the radiation budget and consequences to surface heat fluxes as well as ecosystem exchange of CO2.

Kickoff & Invited Lectures

Monday, August 1, 10:45-11:15 am
A Systems View of Mobility Methods for Aerosol Measurements, Andrew J. Downard, Nicholas Brunelli, RICHARD C. FLAGAN, *California Institute of Technology*

Abstract: The differential mobility analyzer has become the mainstay of aerosol measurements the submicron and nanometer size domains, and has recently been pushed into the low-nanometer, and even subnanometer regimes through the advent of new, highly sensitive, two-stage condensation particle counters. Measurements of the smallest particles, while now possible, have long been limited by the slow time response and/or low count rate (due to low aerosol flow rates) of existing detectors. Both of these factors limit scan rates and introduce uncertainties in the size distributions that are inferred from the measurements. Instruments with exceptional mobility resolution have been developed, albeit with very narrow operating ranges. Some of the factors that constrain mobility analysis are fundamental; others can be overcome or circumvented by considering the mobility classifier and the detector together as an integrated system that must be optimized instead of focusing on the individual components of the measurement system. The systems approach becomes particularly advantageous when measurements must be made outside of the laboratory, especially in the extreme environments accompany many atmospheric measurements. Airborne instruments subject to weight and power limitations. Those constraints become even more severe in personal exposure monitoring, but robustness may be a greater concern in other applications. We consider a range of measurement applications, and examine how an integrated systems approach leads to different choices depending on the nature of the measurement.

Biographical Sketch: Richard Flagan is the Irma and Ross McCollum/William H. Corcoran Professor of Chemical Engineering and Environmental Science and Engineering, and Executive Officer for Chemical Engineering at the California Institute of Technology. He received his Ph.D. from the Massachusetts Institute of Technology in 1973, and has been on the faculty at Caltech since 1975. His research focuses on advancing our understanding of aerosols by pushing the state of the art in aerosol measurements. Current research in his group includes studies of secondary organic aerosol formation and growth, aerosol-cloud interactions, and atmospheric nucleation of new particles under conditions that range from those in the lower troposphere to the upper atmosphere at high latitudes, and in the atmosphere of Saturn's moon, Titan. These studies are enabled by instruments that his group has developed such as the scanning mobility particle sizer (SMPS) and the fast-mixing condensation particle counter. Flagan's group is also studying exposures to airborne allergens, and developing instruments for the automation of pollen counting and novel sensors that are capable of detecting pollen allergens in respirable aerosol particles with attomolar or single molecule sensitivity. Flagan's contributions have been recognized with numerous awards, including the 2006 Fuchs Memorial Award, and election to the National Academy of Engineering in 2010.

Monday, August 1, 3:15-3:45 pm
Condensational Methods for Particle Detection and Collection, SUSANNE HERING, *Aerosol Dynamics Inc.*

Abstract: Dating from Aitken's pioneering work of the late 19th century, and extending to the condensation particle counters in common use today, condensation processes are used to enlarge

particles to a size that enabled their detection. These same methodologies are also used to aerodynamic focus and concentrate particles, and to enable their collection for chemical analysis. Although the basic concept of using condensational enlargement is well-established, recent years have seen many advances in its application to condensation particle counting and to in-situ and off-line particle chemistry determinations. Instruments vary in the material used for the condensation, whether alcohol, glycol or water. They also differ in how the supersaturation necessary for particle activation and growth is achieved. Butanol-based condensation particle counters are "thermally diffusive" laminar flow instruments in which a saturated flow enters a cold-walled condenser, and where the transport of heat to the cold walls of the condenser is the dominant transport process. Within the last few years, a laminar-flow, water-based condensation particle counters have been introduced with similar performance to the butanol instruments. These water-based instruments use a warm-walled condenser and create the required supersaturation based on the difference between heat and water vapor diffusion, and hence are referred to as "differentially diffusive". The water condensation approach is especially amenable for adaptation to measurements of particle chemistry. Dating from the 1990s, steam-injection mixing methods have been coupled to ion chromatographs for in-situ measurement of inorganic ion concentrations, and to water soluble organic carbon measurements. More recently the differentially-diffusive water condensation methods have been adapted to particle chemistry measurements, including applications microchip based electrophoresis measurements for rapid inorganic ion assays. This approach has been used both for in-situ particle chemistry determinations, and for off-line analysis of sequential samples collected in a multiwell plate.

Biographical Sketch: Susanne Hering has developed several aerosol measurement methods, including water-based condensation particle counters, and the thermal desorption aerosol gas chromatograph. She received her PhD in experimental low temperature physics. She is founder and president of Aerosol Dynamics Inc., is a past president of AAAR, and currently serves as an editor of Aerosol Science and Technology.

Monday, August 1, 3:15-3:45 pm
The Production and Evolution of Secondary Organic Aerosol During Smog Chamber Photochemical Reaction Studies of PAH with the OH Radical and the Subsequent Detection of These Products in Smog Samples from Seoul, South Korea and Los Angeles, California, Douglas A. Lane, JiYi Lee, ANTONIO H. MIGUEL, *The Huntington Botanical Gardens*

Abstract: It has long been known that Polycyclic Aromatic Hydrocarbons (PAH) react with atmospheric oxidants such OH free radicals during the day, ozone, and NO3 free radicals at night. The products of these reactions are associated with a host of toxic reaction products. Our experiments have uniquely centered on the reactions of PAH with the OH radical in a 10m3 smog chamber. PAH such as naphthalene, acenaphthene and phenanthrene were selected for this study primarily due to their ubiquitous nature in urban atmospheres. The OH radical is generated through the photochemical reaction of isopropylnitrite in the presence of NO and light to generate the OH radical, while eliminating ozone from the reaction. Thus, the products are formed from the unique reaction of the PAH with the OH radical. Ultra-violet fluorescent lamps surrounding the chamber are turned on for a measured amount of time then turned off. While the lights are on, the OH radical is produced; it ceases immediately when they are turned off, thus freezing the reaction so that air samples may be withdrawn from the chamber for product analysis. The lights are then turned back on and the process is repeated numerous times until the isopropyl nitrite and/or NO are

depleted and ozone begins to appear. The products are withdrawn from the chamber either through an annular diffusion denuder and filterpack for gas/particle partitioned analysis of the products or through a thermal desorption tube containing XAD resin for total product analysis by thermal desorption-multidimensional gas chromatography-time of flight mass spectrometry (TDS-GCxGC-TOFMS). The denuder samples are solvent extracted and run as solutions by GCxGC-TOFMS.

This paper will describe our experimental system and will demonstrate how the gas to particle partitioning of products evolves during the course of the reactions and the production of secondary organic aerosols (SOA). Numerous products detected in the smog chamber will be shown to be present in smog samples from Seoul, South Korea, and from Los Angeles, California. We will show the monthly variation of the concentrations of products such as 2-formylcinnamaldehyde and dibenzopyranone over the course of a year for Seoul. Measurements of 1,2- and 1,4-naphthoquinones, 9,10-phenanthraquinone, and 9,10-anthraquinone reported over a 5-year period in Southern California (Eiguren-Fernandez et al., 2008) confirm the assignments of these toxic quinones observed in our smog chamber studies.

Biographical Sketch: Antonio H. Miguel completed his PhD in the School of Chemical Sciences, University of Illinois at Urbana-Champaign in 1976. He was inducted as a member of Phi Lambda Upsilon Honorary Chemical Society and received the Granite City Steel Company Prize in Environmental Chemistry (1974-1975) for his thesis work. His research focuses on aerosol measurement and behavior with a focus on engine exhaust aerosols. His current research in this area focuses on secondary organic aerosol particle formation in large urban centers, and in situ methods for measuring physical and chemical properties of complex aerosol particles. Dr. Miguel was a faculty member at the UCLA Institute of the Environment where he established and directed the Chemistry Laboratory of the Southern California Particle Center and Supersite, funded by the California EPA and the California Air Resources Board (CARB). Currently Dr. Miguel is an air pollution specialist at the California EPA - ARB Monitoring and Laboratory Division, Haagen-Smit Laboratory in El Monte, CA.

Tuesday, August 2, 10:15-10:45 am
Air Quality Modeling in the Metropolitan Area of São Paulo, MARIA DE FATIMA ANDRADE, *University of São Paulo*

Abstract: The greater metropolitan area of São Paulo has the largest vehicle fleet in Brazil, reaching 10 million vehicles. Vehicles that are more than ten years old account for 50% of the fleet and are responsible for most of the emissions. According to the official emissions inventory for São Paulo more than 85% of CO, VOC, and NOx emissions are derived from mobile sources (CETESB, 2009). In the Metropolitan Area of São Paulo (MASP) representation of the process of formation and transport of pollutants started in 90´s. The first modeling studies were performed with CIT (Caltech Carnegie Mellow photochemical Model) to represent the formation and transport of ozone. It was only included the gas-phase process in the modeling approach. Many important results were obtained regarding the role of COV-NOx relation, meteorological influence on the photochemical formation. For example, Sánchez-Ccoyllo et al. (2009) performed the local sensitivity analysis of CIT model in the MASP, i.e., they solved the system repeatedly while varying one parameter at a time and fixing the other variables. They found that changes in mixing height, wind speed and air temperature input files have the greatest effect on peak ozone in the MASP, and the isolated effect of VOC emission inventory reduction leads to 26% lower ozone levels than in the base case. Vivanco

and Andrade (2006) investigated inaccuracies in the mobile emissions data. They found that NOx and VOC CETESB'S official emission inventory by motor vehicles are respectively overestimated and slightly underestimated. A study of reactivity of ozone precursors described by Martins & Andrade (2008) revealed that, ozone formation in the MASP was more sensitive to variations in VOC emissions than to variations in NOx emissions. In order to improve the mobile emission inventory for São Paulo, measurements inside road tunnels were performed at MASP (Sanchez-Ccoyllo et al., 2007, Martins et al., 2006). The Light-duty vehicles (LDV) emission factors estimated by tunnel measurements for BC (Black Carbon), PM10, PM2.5–10 and PM2.5 were 16, 197, 127 and 92 mg km−1, respectively. The mean contributions of Heavy-duty vehicles (HDV) to emissions of BC, PM10, PM2.5–10 and PM2.5 were 29, 4, 6, and 6 times higher than were those of LDVs. The main constituent of diesel exhaust particles was found to be BC. The calculated EFs were used in air quality models, in the estimative of vehicular impacts on air quality. The diesel emission is an important source of fine particles to the atmosphere, mainly very fine particles, which are related to impacts on human health and atmospheric radiative process. The description of particles formation was considered within the modeling approach with WRF-Chem (Weather Research Forecast with Chemistry) and CMAq models. WRF-Chem has been developed by NOAA with contributions from NCAR, PNNL, EPA, and university scientists. The U.S. Environmental Protection Agency Community Multiscale Air Quality (CMAQ) model is a three-dimensional Eulerian atmospheric chemistry and transport modeling system that simulates ozone, acid deposition, visibility, and fine and coarse particulate matter throughout the troposphere. Recent efforts are being developed to integrate the air quality forecast with health impacts. WRF-Chem was combined with a dose-response model to forecast the air pollutants concentration and its impact on morbidity and mortality. These forecasts can be accessed at www.lapat.iag.usp.br.

Biographical Sketch: Maria de Fatima holds a BS, and MS and a doctorate degree in Physics from the University of São Paulo. Dr. Andrade conducted postdoctoral studies at the California Institute of Technology (Caltech) in 1994. She is currently a faculty member at the University of São Paulo. In 2006 she obtained the Habilitation in the Department of Atmospheric Sciences, at the University of São Paulo. Her research interests lie in the area of Geosciences with emphasis on air pollution, mainly in the areas of atmospheric chemistry, photochemical models, atmospheric aerosols, air quality models and receptor models.

Tuesday, August 2, 10:15-10:45 am
Advances in Near- and Real-Time Monitoring Devices for Ambient Aerosol Chemical Speciation,
ARANTZAZU EIGUREN-FERNANDEZ, *Aerosol Dynamics*

Abstract: Even with the amount of resources that have been invested to develop real-time chemical speciation devices, there is still the need for an instrument that is portable, cheap, reliable and capable of a robust and broad chemical speciation of aerosols in real time. Nowadays there are several instruments that although not perfect are being used successfully for the chemical speciation of particulate matter and vapors in a near- or real-time manner. In this presentation we will look into some of the most recent systems, such as AMS, cantilevers, PILS, their applications, pros and cons.

Biographical Sketch: Arantzazu Eiguren-Fernandez completed her Ph.D. in Analytical Chemistry in 2000, and joined a group of researchers working at the UCLA Southern California Particle Center as a Postdoctoral Researcher. Her research has been focused in characterizing the physical, chemical and

toxicological properties of particulate matter and their relation with adverse health effects. Dr. Eiguren-Fernandez is now working at Aerosol Dynamics and her most recent projects involve the development of new portable field instruments, which are affordable and capable of measuring near- or real-time chemical species present in aerosol particles.

Tuesday, August 2, 2:45-3:15 pm
Biomass burning, long-range transport of products, and regional impacts in South America, SAULO R. FREITAS, *Center for Weather Forecast and Climate Studies (CPTEC), National Institute for Space Research (INPE)*

Abstract: Biomass burning in Amazonia recurrently releases large amounts of trace gases and aerosol particles to the atmosphere. The consequent change from low to very high atmospheric concentrations of oxidants and aerosols therefore affects the radiative, cloud microphysical and chemical properties of the atmosphere over Amazonia. This represents a dramatic perturbation to the regional climate, ecology, water cycle, and human activities. Given the magnitude of burning in Amazonia and the efficiency of the atmospheric transport processes of fire emissions, these perturbations can even affect the climate system on a global scale.

This seminar aims to summarize current studies and numerical regional modeling at INPE of the biomass burning process and its impacts on weather, climate, and air quality. We will describe the model developments associated with the estimation of biomass burning emissions, the plume rise mechanism and the fully coupled atmospheric chemistry transport model developed to study and forecast smoke aerosol and trace gas concentrations, weather and air quality. We will further discuss the atmospheric transport processes that are the main drivers of the dispersion of fire emissions, introduce the most relevant concepts for numerical modeling of smoke transport, and show the general pattern of smoke transport over the South American continent. Finally, we will present the current status of the understanding of local and remote impacts of smoke aerosol particles and trace gases, including public health aspects.

Biographical Sketch: Saulo R. Freitas is Associated Researcher at the Center for Weather Forecasts and Climate Studies at INPE/Brazil. He is also Professor at the Meteorology and Earth System Science Graduation Programs at INPE. He completed his Doctorate Program on 1999 at Physics Institute of University of Sao Paulo. He was a Postdoctoral Researcher at NASA Ames Research Center/USA. He was Visiting Researcher at Laboratoire de Physique et Chimie de l'Environnement of CNRS/University of Orleans - France, at NASA Goddard Space Flight Center, at U.S. National Oceanic and Atmospheric Administration (NOAA) and at Arctic Region Supercomputing Center (Alaska). He has expertise on the regional and mesoscale atmospheric, chemistry and transport modeling. Developed several numerical models and parameterizations for air parcel trajectories calculation, near real time soil moisture estimation, plume rise model for vegetation fires using the super-parameterization concept, and was the main developer of the CATT-BRAMS regional atmospheric chemistry transport model. He also developed the real time operational air quality forecast for South America (http://meioambiente.cptec.inpe.br). Since 1999, he coauthored 64 per-review papers and about 110 proceedings and workshops papers. Currently, Freitas is member of the Working Group: Atmospheric Chemistry for the Weather Research and Forecasting (WRF) Model, and also of the Working Group on Numerical Experiments (WGNE) of World Climate Research Program and WMO Commission for Atmospheric Sciences.

Tuesday, August 2, 2:45-3:15 pm
Major ions in rainwater and particles material: absolute and relative concentrations, ADALGIZA FORNARO, *Universidade de São Paulo, Depto. Ciências Atmosféricas, IAG/USP*

Abstract: Our studies of chemical composition of atmospheric samples (rainwater and particulate matter, PM) have demonstrated the importance of the ionic species (Cl-, NO3-, SO42-, Na+, K+, Ca2+, Mg2+ and NH4+) content. In recent years, studies of rainwater and PM ionic composition from different locations in Brazil, have led to further evaluations of these species. Considering that each ionic concentration depends on the sources (natural or anthropogenic), as well as the prevailing meteorological conditions, comparisons among these regions help elucidate the temporal and spatial variations observed. Some examples are related to higher nitrate and sulfate concentrations suggesting urban and industrial influences, as may be observed in the São Paulo Metropolitan Area and Cubatão, when compared with Cuiabá. Additionally, relative sodium and chloride concentrations have been applied from the sea spray tracer in rainwater and PM, but must be cautiously used in the assessment of fine particles, as is the case for Recife and Rio de Janeiro. Concerning meteorological influences, the rainfall frequency plays an important role as atmosphere cleanser, which results in rainwater and aerosol samples with low ionic concentrations. Ammonium is other important species that has been associated with livestock and agricultural activities as its main source. However, rainwater and aerosol ionic composition results in São Paulo have shown higher NH4+ concentrations. Therefore, a more comprehensive assessment of these major ions in rainwater and PM will be presented based on comparisons of results from different regions of Brazil.

Biographical Sketch: Adalgiza Fornaro graduated with a BS in Chemistry at Londrina State University (1987). Her graduate studies were completed in Analytical Chemistry, receiving a master (1991) and PhD (1996) from the University of São Paulo (USP). Currently, she is a professor at USP in the Atmospheric Sciences Department (IAG/USP), and the coordinator of the Meteorology undergraduate program, and is responsible for the Chemistry Section in the Atmospheric Process Analysis Laboratory (LAPAt). Her current work focuses on studies of rainwater and the chemical composition of particles, focusing on major ionic constitutes, atmospheric oxidants (ozone and hydrogen peroxide), trace elements, organic acids and scavenging process evaluation. She has been collaborator as ad hoc adviser for FAPESP, CNPq and several scientific journals. She holds a Level-2 CNPq scholarship.

Tuesday, August 2, 7:00-8:00 pm
Special Presentation: The Portinari Project: From the Coffee Plantation to the United Nations, JOAO CANDIDO PORTINARI, *Fundador e Diretor-Geral do Projeto Portinari, Pontifícia Universidade Católica do Rio de Janeiro*

Abstract: This tale could be told as a demonstration of Liév Tosltoi's theorem: "if you want to be universal, begin by painting your little village". In fact, it unfolds into two intertwined stories: the fulgurant trajectory of the Brazilian painter Candido Portinari (1903-1962) which starts in a humble tiny village lost in the vast coffee plantations of the State of São Paulo, and attains its apex with the huge (14-meter high each) "War" and "Peace" murals, which were installed in 1957 in the main entrance hall of the United Nations Assembly-General Room as a gift from Brazil to the UN; and the 30-year effort of the Portinari Project, always busy assembling the far-flung pieces of Portinari's oeuvre, life and times: more than 5 thousand murals, paintings, drawings and prints, and 30 thousand documents: letters, periodical clippings, oral history recordings, historical photographs,

books, monographs and varied memorabilia, found all over Brazil and in countries as wide ranging as Argentina and Finland, Haiti and Bulgaria. All exhaustively researched, crossed and catalogued into a multimedia database which offers a privileged itinerary to the main aesthetical, artistic, cultural, social and political concerns of Portinari's generation. This research included the first publication south of the Equator of a Catalogue Raisonné of a painter's complete work (5 volumes, 2,406 pages, more than 5 thousand illustrations, accompanied by a CD-ROM with its entire content plus a search engine allowing queries by many different research keys).

The Portinari Project's own trajectory visits many interdisciplinary routes, in its permanent interaction with colleagues from Mathematics, Physics, Computer Science and Engineering, as for example in the "Brush Stroke Project", a new approach to the old problem of art forgery, adding to the physico-chemical and the "eye-of-the-expert" traditional ways. We presented it at the International Cultural Heritage Informatics Meeting - ICHIM 1993, University of Cambridge, UK. Only a few months ago, Prof. Arne Jensen (Dept. of Mathematics, Aalborg University, Denmark), wrote us: "the brush stroke analysis project is going very well. Our PhD student has programmed the algorithm in Matlab, and the results are amazing. Based on 8 genuine and a few false scans, the genuine ones are clearly distinguishable from the forgeries. So the assumption that the brush strokes characterize the painter is confirmed".

The tale comes back to Tolstoi when the United Nations headquarters in New York go through an historic renovation (2 billion USD in the period 2009-2013) which implies the removal of all its artworks and this opens up the first opportunity (in 52) years to take the "War" and "Peace" murals for exhibition in Brazil and in Europe.

Biographical Sketch: Ph.D. from the Massachusetts Institute of Technology - MIT (1966). Ingénieur Civil des Télécommunications from the École Nationale Supérieure des Télécommunications (1963), graduate in Mathématiques Spéciales from Lycée Louis-Le-Grand, Paris (1960), graduate in Mathématiques Supérieures from Lycée Louis-Le-Grand (1959).

After ten years abroad, João Candido Portinari returns to Brazil by invitation of the Pontifical Catholic University of Rio de Janeiro. Prof. Portinari was one of the founders of the Mathematics Department of PUC-Rio and was Head of the Department in the period 1968-70. Since 1979, he has been the General-Director of the Portinari Project, which he conceived and set up. Among other actions the Portinari Project published, in 2004, after 25 years of research, the Catalogue Raisonné of the complete works of the Brazilian painter Candido Portinari (1903-1962). Prof. Portinari is also the President of the Candido Portinari Cultural Association and President of Portinari Licensing, a company that owns the trademark PORTINARI. He was granted the CLIO Prize of History, by the São Paulo Academy of History (2004) and the Sérgio Milliet Prize, awarded by the Brazilian Association of Art Critics (2005) and also, for Portinari Project's work, the prize Rodrigo Mello Franco de Andrade, awarded by the National Institute for the Historic and Artistic Heritage (IPHAN - 2004) and the prize Jabuti (Brazilian Book Chamber - 2005). He was also awarded the title of Honorary Citizen São Carlos (SP), in 2007. In 2008 he was awarded the National Commend of Cultural Merit of Brazil. More information about the Portinari Project is available at www.portinari.org.br.

Wednesday, August 3, 10:15-10:45 am
State of the Air – Air Pollution Levels in the Past and Present, Sulekha Chattopadhyay, *Independent Air Quality Professional*

Abstract: Over the past decades, California has seen a large growth in population, leading to a larger number of vehicles sold and miles traveled. The growth came at the cost of increases in smog forming pollutants such as oxides of nitrogen, sulfur, toxic species, lead, and a general degradation of air quality. If this trend continued, the impact on human and environmental health would be severe. Here we present a short background of the Air Resources Board and its role in shaping today's air quality as well as some of the problems that remain.

Biographical Sketch: Sulekha Chattopadhyay received her Ph.D. from the University of California, Riverside, in 2004. She is the recipient of the Dean's fellowship from UC-Riverside. She is also the recipient of Guru Gobind Singh Fellowship for her graduate studies and Rotary International's award during her undergraduate studies. Her interests are, understanding the fate and transport of organic aerosols. Sulekha has participated in various national and international conferences and chaired several sessions.

Wednesday, August 3, 10:45-11:45 am
Quantifying the contribution of emissions from combustion systems to ambient organic aerosols, ALLEN L. ROBINSON, *Center for Atmospheric Particle Studies, Carnegie Mellon University*

Abstract: Motor vehicles, wood stoves, and other combustion systems are major sources of organic aerosols. This talk synthesizes results from recent smog chamber studies of motor vehicle emissions, open biomass burning emissions, and aircraft exhaust that highlight the chemistry and physics that control the contribution of these sources to atmospheric aerosol levels. The results reveal a picture of dynamic partitioning and dramatic changes with oxidation. This new picture alters our understanding of the contribution of combustion sources to urban and regional pollution and brings chemical transport model predictions into better agreement with field observations. An important finding is that secondary organic aerosol production often greatly exceeds the direct or primary emissions from most combustion systems; therefore, it must be included in any assessment of the contribution of combustion systems to ambient organic aerosol concentrations. However, existing atmospheric chemistry models cannot predict the observed secondary organic aerosol production. Low-volatility organic vapors emitted by combustion systems appear to be very important secondary organic aerosol precursors that are poorly accounted for in inventories and models. Therefore, new approaches will likely be required to include these vapors in models. The talk concludes by discussing the implications that the dynamic nature of these organic aerosol emissions has on source testing for both emission inventory development and regulatory purposes.

Biographical Sketch: Dr. Allen Robinson is a Professor in the Departments of Mechanical Engineering and Engineering and Public Policy at Carnegie Mellon University. His research examines the impact of emissions from energy systems on urban and regional air quality, organic aerosols, and biomass energy. A current focus is the measurement and simulation of physicochemical transformation of organic emissions from combustion systems. Dr. Robinson joined Carnegie Mellon in 1998 after working for two years as a Postdoctoral Fellow at the Combustion Research Facility at Sandia National Laboratories. He received his Ph.D. from the University of California at Berkeley in Mechanical Engineering in 1996 and his B.S. in Civil Engineering from Stanford University in 1990. He

received the Carnegie Institute of Technology Outstanding Research Award in 2010, the Ahrens Career Development Chair in Mechanical Engineering in 2005 and the George Tallman Ladd Outstanding Young Faculty Award in 2000.

Wednesday, August 3, 12:00-12:30 pm
Invited Talk: Processes Relevant to Aerosol Formation from First Principles Based Theory and Electrospray Ionization Mass Spectrometry Experiment, WILLIAM A. GODDARD III, Himanshu Mishra, Shinichi Enami, Robert J. Nielsen, Michael R. Hoffmann and Agustín J. Colussi, *California Institute of Technology*

Abstract: Advances in theoretical and computational chemistry are making it practical to consider using first principles based methods and simulations to understand the mechanisms and rates of reaction for complex systems. We will summarize some of these methods (particularly the prediction of accurate entropies and free energies and reaction barriers).

We will illustrate this with recent studies relevant for aerosol formation where we compare to recent experiments on the initial interaction of small molecules (e.g. nitric acid and isoprene) with water microdrops using online electrospray ionization mass spectrometry.

Biographical Sketch: Professor Goddard has been a member of the Faculty of the Chemistry Department at the California Institute of Technology (Caltech) since November 1964, where he is now Charles and Mary Ferkel Professor in Chemistry, Materials Science, and Applied Physics. His research career has focused on developing methods to solve problems in catalysis, materials science, and pharma from first principles (no use of empirical data). He uses multiscale multiparadigm technologies to make first principles methods practical for critical problems in catalysis, nanotechnology, fuel cells, and pharma. Thus, his work bridges between fundamentals of physics and chemistry, new developments in computer science, and practical applications. Professor Goddard has published over 928 scientific articles. See http://www.wag.caltech.edu/publications/papers.

Professor Goddard has been a member of the National Academy of Sciences (US) since 1984 and recipient of numerous other awards including the Feynman Prize for Nanotechnology Theory (1999) and the 2008 Theoretical Chemistry Award from the American Chemical Society. He was named as one of the 99 most Highly Cited Chemists for 1981 to 1999 (http://isihighlycited.com). In January 2004, he was awarded an honorary PhD (Honoris Causa Philosophia Doctorem) from Uppsala University, Sweden and in 2008 he was elected a Fellow of the Royal Society Chemistry.

Professor Goddard is a native of California. A short autobiography is in J. Phys. Chem. A 104, 2147 (2000). He received his BS Engineering (Highest honors) from UCLA in June 1960 and his PhD in Engineering Science with a minor in physics from Caltech in October 1964.

Professor Goddard has been the Director of the Materials and Process Simulation Center in the Beckman Institute at Caltech since it was founded in 1990 to develop collaborations with industry to solve important industrial problems in materials, catalysts, and Pharma. He was also a co-founder of several companies: Accelrys (1984), Schrödinger (1991), Allozyne (2005), Systine (2005) to commercialize technologies developed partly in his group.

Thursday, August 4, 10:15-10:45 am

Air Pollution and Health Impacts in Diadema, São Paulo: a retrospective and critical analysis, SIMONE GEORGES EL KHOURI MIRAGLIA, Pedro Garcia Giacon, Gabriela dos Santos Fernandes, Leonardo Gonçalves Ruivo, *Universidade Federal de São Paulo - UNIFESP*

Abstract: In Brazil, the scenario of air pollution in urban areas led the government to adopt a pollution control program in order to reduce air pollutant emissions. Industrial emissions were successfully controlled in the mid-70s and early 80s, leading attentions towards the automobile sources. Diadema is an industrialized city located in the São Paulo Metropolitan Region (SPMR) and counts on about 1,500 industries, a population about 397,738 inhabitants in an area of 30.84 km2 and a vehicle fleet of 82,242 cars, 9,819 trucks, 1,107 buses and 25,479 motorcycles (IBGE 2010).

This research analyzes the air pollutants evolution in the studied period as well as the relation to health indicators in terms of cardio respiratory deaths. Estimates were based on chronic effects of the pollutants for being more adequate to represent the effects upon large urban areas' inhabitants. The reference pollutants are PM10 and O3 for presenting the more consistent adverse effects to human health and for being the exclusively monitored pollutants in the city.

Evaluation of the mortality due to respiratory and cardiovascular diseases associated to pollutant levels in the period of the study (2004 to 2008) was conducted. The results indicated a Pearson correlation of PM10 and the population mortality due to cardio respiratory causes (0.353 significant at the 0.01 level).

PM10 values varied from 24.71 to 59.47 μg/m3 (average 36.02 μg/m3) and O3 values varied from 37.74 to 142.08 μg/m3 (average 76.38 μg/m3). Monthly mortality due to cardio respiratory causes varied from 36 to 93 deaths, with an average of 67.73 deaths.

Economic incentives for environmental protection should also guarantee benefits in terms of health expenditures and quality of life. The increase of automotive fleet and heating of the economy leads to conclude for the need of more rigorous measures in air pollution control programs.

Biographical Sketch: Mrs. Miraglia is an engineer. She holds a BSc and an MSc degree from the Polytechnic School of the University of São Paulo (Poli-USP), where she developed a dissertation on transportation and fuels impacts on air pollution. She holds a PhD from the Medical School of the University of São Paulo (FM-USP), where she wrote a thesis on a new approach for DALY health indicator and cost estimation for the air pollution health effects for São Paulo and a Pos-Doctorate focusing on the “Environmental Valuation of the Health Impacts due to Atmospheric Pollution in São Paulo, Brazil”.

Since 2009 Simone Miraglia has been a professor in the Federal University of São Paulo (UNIFESP) where she has achieved a position which enables her to develop her research with focus on health indicators and valuation estimates for urban environmental pollution impacts.

Mrs. Miraglia was a research collaborator in the Laboratory of Experimental Air Pollution of FM-USP since 1994 and a university professor on environmental issues in several business administration courses and a graduate program professor on environmental engineering.

Thursday, August 4, 2:45-3:15 pm
Indoor Air and Bioaerosols: Actual Situation and Perspectives, BENIGNO SANCHEZ, *Energy, Environmental, and Technological Research Center (CIEMAT)*

Abstract: Traditionally, air pollution was related only to the presence of dangerous concentrations of chemicals in the outdoor environment. However, in indoor environments a multitude of pollutant sources are present. Pollutants such as volatile organic compounds, dust; radon, CO2 and a high content of bioaerosols could be found indoors. Nowadays, a new line of research focuses in the study of the connection between indoor and outdoor pollution.

Some research groups focus their efforts to sampling and measurement of bioaerosols that can cause poor indoor air quality (IAQ), especially in "public places" such schools, hospitals, transportation systems or office buildings. Surprisingly, there is not a gold standard method for microorganisms sampling. The characterization of the microorganisms –both bacteria and fungi- used to be done by techniques such as microscopy or biochemical test (API galleries); these traditional techniques have given way to modern and much more precise techniques like Polymerase Chain Reaction (PCR) with subsequent sequencing. In recent years this technique has commonly been used for identification of bacteria, but is beginning to identify fungi.

Air is one of the main vehicles of diseases transmission. According to estimates by the World Health Organization (WHO), 1,619,000 people die each year in the world prematurely (before reaching the fixed life expectancy for their country) due to acute or chronic effects caused by an unacceptable IAQ. Many investigations deal with the public health effects of indoor biological exposures, mainly with diseases like allergies and asthma, but also with the toxicology and physiological or psychological responses of humans.

Currently, there are several types of techniques to improve the IAQ, for instance ventilation and filtration (both non destructive) or ultraviolet germicidal irradiation and the most effective and environmentally friendly photocatalytic oxidation (both destructive). Most of these technologies are already applied in air conditioning systems and their efficiency is being proved at laboratory scale. However, little is known on how these devices performance in actual field settings and the subsequent effects on occupants' health and comfort.

Biographical Sketch: Benigno Sánchez was born in Iscar (Valladolid), Spain, 1955. He holds a B.Sc. Degree in Biology and Ph.D. in Chemistry from the Autonomous University of Madrid. He also has a Diploma in Environmental Engineering and a Diploma in Territorial Zoning and Environment from the University of Valencia.

At present, Dr. Sánchez is SENIOR RESEARCHER at the CIEMAT (Centro de Investigaciones Energéticas Medioambientales y Tecnológicas), a public research center, since 1998, and has been a CIEMAT researcher since 1985. He has been the Head of the Environmental Applications of Solar Radiation to Air Group in the Department of Energy, Plataforma Solar de Almería Division, since 1990. From 1985 to 1990, he worked in the CIEMAT Environment Area, defining the lines of work and starting up a group on air pollution and its effects on ecosystems.

He has accumulated 26 years of R&D experience, has participated in 28 national and international R&D projects funded by competitive public programs, as head researcher in 16 of them, has

participated in 6 R&D contracts with businesses of special relevance, and he is coauthor of 42 scientific-technical publications, 68 contributions to congresses and a multitude of participations in courses, seminars and conferences.

He has directed 3 Ph.D. theses with 2 more currently underway, 14 degree projects in Environmental Science and Chemical Engineering at the UAM, URJC and UCM in Madrid.
He has been the national representative to COST 612 (Brussels) and Task Forces related to the effects of air pollution on ecosystems (UN, Geneva).

He is Member and the Spanish representative in the academic committee of the European Photocatalysis Federation (EPF).

He is a referee for Applied Catalysis B: Environmental and Chemosphere and CYTED Evaluator, and Member of the Organizing Committee of the "International Conference on TiO2 Photocatalysis".

Friday, August 5, 10:15-10:45 am
Atmospheric aerosols in the context of the changing environment of central São Paulo State, ANDREW GEORGE ALLEN, *São Paulo State University*

Abstract: Anthropogenic emissions are a major influence on the physical and chemical properties of lower troposphere aerosols in rural regions of southeast Brazil. This paper presents an overview of recent work undertaken to evaluate the impacts of emissions from sources such as biomass burning, road transport and dust resuspension on: (a) the spatial distribution of aerosol concentration and composition; (b) deposition of nutrient species; and (c) cloud physical characteristics.

Aerosols and gases containing the macronutrient elements N, P, S, K, Ca and Mg were measured in different regions of São Paulo State. Substantial spatial variability was observed, primarily related to the nature and intensity of human activity. In northern, western and central regions of the State, the practice of biomass burning associated with the sugar cane harvest is an important determinant of the concentrations of aerosols and their precursor gases. Of especial note is the influence on reactive nitrogen (Nr) chemistry. In the south of the region, industrial activity is responsible for elevated levels of SO2, Ca2+ and F-. In less impacted coastal regions marine aerosols predominate.

The spatial variability of Nr (NO2, NH3, HNO3, and aerosol nitrate and ammonium) is interpreted in terms of emission source strengths, atmospheric transport and chemical reactions. Due to the region's emissions of nitrogen oxides from biomass burning and road transport, oxidized species account for ~90 % of dry deposited Nr. Close to urban areas the largest component is NO2-N, however the contribution of HNO3¬-N increases downwind, and for the region as a whole is the most important component of deposited Nr. A simple mathematical model has been developed to enable determination of total Nr dry deposition from knowledge of NO2 concentrations.

In the main sugar cane production / biomass burning region of São Paulo State investigation of the relationship between aerosols measured at the surface and cloud droplet effective radius (re) indicates that in the presence of daytime convection there is an inverse relationship between number concentrations of aerosols and re during the burning season. However at other times there is a positive correlation between these parameters, which could be due to cloud processing and growth of aerosols. The findings indicate that biomass burning in the region influences the cloud

formation process, which could in turn affect precipitation, ecosystems and water resource management.

Biographical Sketch: Dr. Allen graduated in Agricultural Biochemistry - University of Newcastle upon Tyne (1981) and received his Ph.D. in Environmental Chemistry - University of Essex (1989). His studies include the atmosphere in New Zealand (DSIR, 1991-1992), urban pollution and biomass burning (USP, 1993-1994) and flows soil / atmosphere (BBSRC, 1994). He has conducted research and project management at the University of Birmingham (1994-2007), mostly in collaboration with institutes in Europe and Brazil. Dr. Allen currently conducts research at Institute of Chemistry, UNESP. He works in Geosciences with an emphasis on composition of the troposphere, the atmospheric processes, flows, air / water / soil and air pollution studies including biomass burning, vehicle transport, and human and natural sources of emissions to the atmosphere.

Technical Program

(Authors in all capital letters are presenting)

MONDAY - AUGUST 1

8:00-6:00 pm.....Local registration
8:30-9:00 am.....Breakfast
9:00-9:30 am.....**Opening remarks,** Paulo Eduardo Artaxo Netto, BAAR President
9:30-10:30 am.....**Keynote address**
Aerosol Science and Technology Enabling Energy Applications, PRATIM BISWAS, *Washington University in St. Louis*
10:30-10:45 am.....Coffee
10:30-4:00 pm.....Exhibitors Open

10:45-12:15 am.... Session 1

1A – Instrumentation 1 – Peter McMurry (Chair) and Susanne Hering (Co-Chair)

10:45-11:15 am.....Kick-off session:
A Systems View of Mobility Methods for Aerosol Measurements, Andrew J. Downard, Nicholas Brunelli, RICHARD C. FLAGAN, *California Institute of Technology*

Platform Instrumentation 1
11:15-11:35 am.....**Use of a Soft X-ray Neutralizer for Particle Measurements,** TIM JOHNSON, Markus Gälli, *TSI Incorporated*
11:35-11:55 am.....**Development of a low-cost system for PM collection with particle size magnification, inertial impaction and quantitative determination of the ionic content by capillary electrophoresis with contactless conductivity detection,** LÚCIA HELENA COELHO, Ivano Gutz, *Universidade Federal do ABC*
11:55-12:15 pm.....**Comparative Studies of Instruments That Measure Black Carbon Properties in Mexico City,** GRACIELA RAGA, Darrel Baumgardner, *Universidad Nacional Autonoma de Mexico*

1B – Emissions – Allen Robinson (Chair) and Sulekha Chattopadhyay (Co-Chair)

Platform Emission
11:15-11:35 am.....**Chaos is cheap: aerosol processing of materials for energy applications,** SHERYL H. EHRMAN, *University of Maryland*
11:35-11:55 am.....**Energy Consumption and Emissions from the Interurban Road Transport in Spain: A Conceptual Approach,** PEDRO JOSE PEREZ-MARTINEZ, *Universidad Politécnica de Madrid/Universidad de São Paulo*
11:55-12:15 pm.....**Particle emissions from combustion of western Mediterranean wood types: comparison between different appliances,** CELIA A. ALVES, Catia Gonçalves, Patricia Fernandes, Ana Calvo, Luis Tarelho, Teresa F.V. Nunes, Casimiro A. Pio, Hans Puxbaum, *CESAM, University of Aveiro*

12:15-2:00 pm Lunch Break

2:00-3:00 pm.....**Plenary Lecture**
Tandem Measurements of Aerosol Properties, PETER H. MCMURRY, *Department of Mechanical Engineering, University of Minnesota*
3:00-3:15 pm.....Coffee

3:15-4:45 pm..... Session 2

2A – Instrumentation 2 – Richard Flagan (Chair) and Tim Johnson (Co-Chair)

3:15-3:45 pm.....Kick-off session:
Condensational Methods for Particle Detection and Collection, SUSANNE HERING, *Aerosol Dynamics Inc.*

Platform Instrumentation 2
3:45-4:05 pm.....**Petrobras Technological Advances in Air Pollution,** Maria Cecília Gonçalves Pontes Massa, IRENE GABARDO, Tadeu Melo, Ednardo Moreira, Mariana Taranto, Clarisse kaufmann, Christiano Pires de Campos, Luciana Loureiro, Eduardo David, Ricardo Gutierres, *CENPES / Petrobras*
4:05-4:25 pm.....**Evaluation of a High Resolution Optical Particle Spectrometer,** TIM JOHNSON, Hee-Siew Han, Avula Sreenath, Nathan T. Birkeland, George J. Chancellor, *TSI Incorporated*

2B – Aerosol Chemistry 1 – Paulo Artaxo (Chair)

3:15-3:45 pm.....Kick-off session:
The Production and Evolution of Secondary Organic Aerosol During Smog Chamber Photochemical Reaction Studies of PAH with the OH Radical and the Subsequent Detection of These Products in Smog Samples from Seoul, South Korea and Los Angeles, California, Douglas A. Lane, JiYi Lee, ANTONIO H. MIGUEL, *The Huntington Botanical Gardens*

Platform Aerosol Chemistry 1
3:45-4:05 pm.....**Air pollution and fireworks: some relation?,** REGINA MAURA MIRANDA, Adalgiza Fornaro, Maria de Fatima Andrade, *University of São Paulo*
4:05-4:25 pm.....**Levoglucosan and water soluble organic carbon and in atmospheric aerosols from rural regions of São Paulo State – Brazil,** Roberta Cerasi Urban, MARIA LUCIA ARRUDA MOURA CAMPOS, Maria Eugenia Costa Queiroz, Letícia Caetano Silva, Arnaldo Alves Cardoso, Andrew George Allen, Raquel Fernandes Pupo Nogueira, Michele Lima Souza, *Universidade de São Paulo*
4:25-4:45 pm.....**Measuring sub-micron aerosol at São Paulo, Brazil: A site with high variability and new particle formation events,** John Backman, LUCIANA RIZZO, Tuukka Petäjä, Hanna Manninen, Tuomo Nieminen, Pasi Aalto, Fernando Morais, Risto Hillamo, Paulo Artaxo, Markku Kulmala, *University of Helsinki*

TUESDAY - AUGUST 2

8:00-6:00 pm.....Local registration
8:30-9:00 am.....Breakfast
10:00-4:00 pm.....Exhibitors Open
09:00-10:00 am.....**Plenary Lecture**
Chemical & Physical Modeling of Aerosols, DONALD DABDUB, *University of California, Irvine*
10:00-10:15 am.....Coffee

10:15-11:45 am.... Session 3

3A – Aerosol Modeling – Donald Dabdub (Chair) and Fatima Andrade (Co-Chair)

10:15-10:45 am.....Kick-off session:
Air Quality Modeling in the Metropolitan Area of São Paulo, MARIA DE FATIMA ANDRADE, *University of São Paulo*

Platform Aerosol Modeling
10:45-11:05 am.....**High-resolution atmospheric modeling and health impacts in Tula-Tepeji ---an industrial region in Mexico,** E. M. MELGAR-PANIAGUA, A. De Vizcaya-Ruiz, S. J. Rothenberg, A. Cohan, D. Dabdub, *Toxicología, Centro de Investigación y de Estudios Avanzados del IPN*
11:55-12:15 pm.....**Characterization of aerosol particles in Buenos Aires,** A. G. Ulke, M. Torres-Brizuela, D. Baumgardner, G. RAGA, Darrel Baumgardner, *Universidad Nacional Autonoma de Mexico*
11:25-11:45 am.....**Modeling secondary organic aerosols in an urban area: Application to Paris, France,** FLORIAN COUVIDAT, Karine Sartelet, Christian Seigneur, *CEREA, Joint Laboratory École des Ponts ParisTech/EDF R&D, Université Paris-Est*

3B – Urban/Regional/Global Aerosols 1 – Andrew Allen (Chair) and Antonio H. Miguel (Co-Chair)

10:15-10:45 am.....Kick-off session:
Advances in Near- and Real-Time Monitoring Devices for Ambient Aerosol Chemical Speciation, ARANTZAZU EIGUREN-FERNANDEZ, *Aerosol Dynamics*

Platform Urban/Regional/Global Aerosols 1
10:45-11:05 am.....**Natural background aerosols and precipitation chemistry derived by 4 year measurements in a remote site in Central Amazonia,** THEOTONIO PAULIQUEVIS, Paulo Artaxo, Maria Lucia Antunes, *Universidade Federal de São Paulo*
11:05-11:25 am.....**Fine Particulate Matter (MP2.5) and Black Carbon Concentrations in two points in the Paraíba Valley, 2010-2011,** FRANKLIN VELARDE ROSASCO, Rauda Lucia Mariani, Paulo H.N. Saldiva, Adalgiza Fornaro, *Universidade de São Paulo-USP/Instituto Astronomia, Geociências e Ciências atmosféricas (IAG)*

11:25-11:45 am.....**Validation of a Custom Particulate Matter Sampler,** MICHELLE HARUMI NAKAMINE, Maria de Fatima Andrade, *Instituto de Astronomia, Geofísica e Ciências Atmosféricas - USP*

11:45-1:30 pm Lunch

1:30-2:30 pm.....**Plenary Lecture**
Climatic effects of aerosols in Amazonia, PAULO ARTAXO, Luciana Rizzo, Kenia Wiedemann, Samuel P. Camara, Melina Paixão, Samuel P. Camara, Micael Cecchini, Andrea Arana, Silvia Lucca, *Institute of Physics, University of São Paulo*
2:30-2:45 pm.....Coffee

2:45-4:15 pm..... Session 4

4A – Aerosols, Clouds, and Climate - Maria Yamasoe (Chair) and Rahul Reddy (Co-Chair)

2:45-3:15 pm .....Kick-off session:
Biomass burning, long-range transport of products, and regional impacts in South America, SAULO R. FREITAS, *Center for Weather Forecast and Climate Studies (CPTEC), National Institute for Space Research (INPE)*

Platform Aerosols, Clouds, and Climate
3:15-3:35 pm.....**Aerosol optical model classification using polytomous logistic regression,** TASSIO S COSTA, Marcia A Yamasoe, *University of São Paulo*
3:35-3:55 pm.....**Evolution of Aerosol Properties Before, During After Fog Events Near Paris, France,** DARREL BAUMGARDNER, Graciela Raga, *Universidad Nacional Autonoma de Mexico*
3:55-4:15 pm.....**Long term measurements of aerosol optical properties in the Amazon Basin,** LUCIANA VARANDA RIZZO, Paulo Artaxo, Kenia T. Wiedemann, Alexandre L. Correia, Thomas Muller, Alfred Wiedensohler, *Institute of Environmental, Chemical and Pharmaceutics Sciences, Department of Earth and Exact Sciences, Federal University of São Paulo, Brazil*

4B – Urban/Regional/Global Aerosols 2 – Renato P. Camata (Chair) and Adalgiza Fornaro (Co-Chair)

2:45-3:15 pm .....Kick-off session:
Major ions in rainwater and particles material: absolute and relative concentrations, ADALGIZA FORNARO, *Universidade de São Paulo, Depto. Ciências Atmosféricas, IAG/USP*

Platform Urban/Regional/Global Aerosols 2
3:15-3:35 pm.....**Rainwater ionic composition in Cubatão, an area with intense industrial activities,** RAFAEL CESARIO DE ABREU, Marcelo Vieira da Silva Filho, Adalgiza Fornaro, *Universidade de São Paulo*

3:35-3:55 pm.....**Spatiotemporal distribution of light-absorbing carbon in Stockholm,** Patricia Krecl, ADMIR TARGINO, Christer Johansson, *Stockholm University*

4:15-6:00 pm..... Poster Session 1

Instrumentation and Methods

- **Efficiency of a Rotating Particulate Matter Sampler in a Carbon Rich Environment,** IVAN GREGORIO HETEM, Maria de Fátima Andrade, *Instituto de Astronomia, Geofísica e Ciências Atmosféricas - Universidade de São Paulo*
- **Validation of a Custom Particulate Matter Sampler,** MICHELLE HARUMI NAKAMINE, Maria de Fatima Andrade, *Instituto de Astronomia, Geofísica e Ciências Atmosféricas - USP*
- **Study of Particles Deposition Flux to the Metropolitan Area of Vitoria Using TSP Data.,** MAYANA RIGO ALVES, Neyval Costa Reis Junior, Rogério Queiroz, *University of Espirito Santo - Environmental Engineering Department*
- **A Generalized Cell Method for Hard Disk Molecular Dynamics Simulation of Polydisperse Systems,** Mevlut Bulut, RENATO P. CAMATA, *Universidade Federal do ABC and University of Alabama at Birmingham*
- **Measurements of the Coagulation Behavior of Highly Charged Aerosols Produced by Laser Ablation,** Mevlut Bulut, RENATO P. CAMATA, *Universidade Federal do ABC and University of Alabama at Birmingham*

Aerosol Chemistry

- **Aerosol Physical and Chemical Characteristics in the Region of Ourinhos (São Paulo State),** LETICIA CAETANO SILVA, Arnaldo Alves Cardoso, Andrew Gorge Allen, Gerhard Held, *Universidade Estadual Paulista*
- **Chemical Characterization of Particulate Matter (PM10) from representative areas of Rio de Janeiro, Brazil,** BEATRIZ AMARAL, Tatiana Saint'Pierre, Adriana Gioda, *Pontifical Catholic University of Rio de Janeiro/PUC-Rio*
- **Study of the chemical elements in atmospheric particles (PM 2.5) in the urban area of Porto Alegre, RS, Brazil,** ANA CLARA IUSTEN PROHMANN, Natália Brucker, Solange Cristina Garcia, Adriana Gioda, *Pontifical Catholic University of Rio de Janeiro*
- **Study of the chemical elements in atmospheric particles in an infant school education in the urban area of Rio de Janeiro, Brazil,** ANA CLARA IUSTEN PROHMANN, Luiz Francisco Maia, Adriana Gioda, *Pontifical Catholic University of Rio de Janeiro*
- **Environmental nuisance caused by atmospheric pollution, odors and sedimentary particles,** Antonio Paula Nascimento, Jane Meri Santos, EDILSON NASCIMENTO, Samira Barbirato, Israel Soares, Milena Machado, Andler Melo, *Federal University of Espirito Santo*
- **Preliminary results of aerosol monitoring in the megacity of Buenos Aires: Regional/local perspective,** VICTORIA PEREYRA, Raquel Jasan, Griselda Polla, Laura Dawidowski, Darío Gómez, Patricia Smichowski, *Argentinian Atomic Energy Commission*

- **Caracterization of particulate matter from urban air pollution in Salvador, BA, Brazil,** NELZAIR ARAUJO VIANNA, Argemiro D´Oliveira Junior, Leonardo Rodrigues Andrade, *Vigilância em Saúde Ambiental*
- **PM trend study for the 1998 - 2010 period: A consequence of an air quality decontamination and prevention plan.,** MARCELA ANDREA CASTILLO, Felipe André Reyes, Andrés Henriquez, Pedro Pablo Oyola, *Centro Mario Molina*
- **Evaluation of rainwater chemical composition in São Paulo State,** MARCELO VIEIRA, Adalgiza Fornaro, Jairo Pedrotti, *USP IAG*
- **Spatial and elemental chemical patterns of size fractionated road dust samples collected in the megacity of Buenos Aires, Argentina.,** FABIÁN FUJIWARA, Raúl Jiménez Rebagliati, Laura Dawidowski, Darío Gómez, Griselda Polla, Patricia Smichowski, *Comisión Nacional de Energía Atómica*
- **Effects of biodiesel blending on redox activity of particulate matter from diesel engine,** Aline Lefol Nani Guarieiro, Gisele Olimpio da Rocha, ARANTZA EIGUREN-FERNANDEZ, Jailson Bittencourt de Andrade, *Universidade Federal da Bahia*
- **Application of the ratios between polycyclic aromatic hydrocarbons in the assessment of emission sources of the particulate matter (PM10) in São Paulo state.,** FERNANDO CAVALCANTE DOS SANTOS, Pérola de Castro Vasconcellos, *Centro de Ciência do Sistema Terrestre - INPE*

Urban / Regional / Global Aerosols

- **Elemental Composition of the Atmospheric Aerosol in the Central Amazon Basin.,** ANDRÉA ARANA, Paulo Artaxo, *National Institute of Research in Amazonia - INPA*
- **Evaluation of Fraction of Absorbed Photosynthetically Active Radiation by Primary Rain Forest in the Amazon During the Dry Season of 2007,** RENATO KERCHES BRAGHIERE, Márcia Akemi Yamasoe, *Universidade de São Paulo*
- **Marine aerosol in the Metropolitan Area of Buenos Aires (MABA),** MARINA DOS SANTOS, Darío Gómez, Patricia Smichowski, Laura Dawidowski, Griselda Polla, *Comisión Nacional de Energía Atómica*
- **Exposure-annoyance relationships for dustfall: survey and panel study for an impacted region,** LARISSA BARBOSA SOUZA, Neyval Costa Reis Júnior, *UFES*
- **The contribution of Gas Stations to Volatile Organic Compounds Levels in Metropolitan Region of Chile,** YEANICE ANDREA VÁSQUEZ, Andrés Rubén Henriquez, Pedro Pablo Oyola, *Centro Mario Molina*
- **A first look at in-situ aerosol microphysical and optical properties in Buenos Aires,** Ana Graciela Ulke, Marcela Maria Torres Brizuela, Graciela Raga, DARREL BAUMGARDNER, *Centro de Ciencias de la Atmosfera - Universidad Nacional Autonoma de Mexico*
- **PM2.5 measurements and characterization in the Metropolitan Region of Vitória, ES, Brazil,** BRIGIDA GUSSO MAIOLI, Neyval Costa Reis Júnior, Taciana Toledo de Almeida Albuquerque, Jane Meri Santos, Melina Conti, Cherlio Scandian, *Federal University of Espirito Santo*
- **Remote vs. in situ observations of aerosols over the Santiago basin: representativity and trends,** Patricia Carvajal, JERÓNIMO ESCRIBANO, Laura

Gallardo, Roberto Rondanelli, *Centro de Modelamiento Matemático, Universidad de Chile*

- **Aerosol Characteristics over the Tropical Urban Station Pune, India,** M P RAJU, P D Safai, *Indian Institution of Tropical Meteorology*
- **Remote Sensing of Aerosols and Water Vapor in the Amazon within the AEROCLIMA project,** HENRIQUE DE MELO JORGE BARBOSA, Paulo E. Artaxo, *Universidade de São Paulo*
- **Remote Sensing of the Aerosols with High Spatial Resolution in the Amazon - Importance of the Surface Reflectance,** SILVIA DE LUCCA, Paulo Artaxo, Andrea de Almeida Castanho, *Institute of Physics, University of São Paulo*
- **Evaluation of the Ozone Monitoring Dataset over the Metropolitan Area of Vitória – ES, Brazil,** ENILENE LOVATTE, Jane Meri Santos, Taciana Toledo de Almeida Albuquerque, Leovegildo Izidoro Neto, *Federal University of Espirito Santo*

6:00-7:00 pm..... Round Table Discussion: New aerosol experiments in Amazonia: from biogenic emissions to urban air pollution, led by Paulo Artaxo, *University of São Paulo*

7:00-8:00 pm..... Conference Cocktail, CTC Dean's Office, *PUC*

Special Presentation: The Portinari Project: From the Coffee Plantation to the United Nations, JOAO CANDIDO PORTINARI, *Fundador e Diretor-Geral do Projeto Portinari, Pontifícia Universidade Católica do Rio de Janeiro*

WEDNESDAY - AUGUST 3

8:00-6:00 pm.....Local registration
8:30-9:00 am.....Breakfast

9:00-10:00 am..... Plenary Lecture

Known and Unexplored Organic Constituents in the Earth's Atmosphere: Instrument Development to Enhance Exploration, ALLEN GOLDSTEIN, *University of California at Berkeley*

10:00-10:15 am.....Coffee

10:15-1:00 pm..... Session 5

5A – Aerosol Chemistry 2 - Allen Goldstein (Chair) and Arantzazu Eiguren-Fernandez (Co-Chair)

Kick-off session:

10:15-10:45 am.....**State of the Air – Air Pollution Levels in the Past and Present,** SULKKHA CHATTOPADHYAY, *Independent Air Quality Professional*

10:45-11:45 am ....**Quantifying the contribution of emissions from combustion systems to ambient organic aerosols,** ALLEN L. ROBINSON, *Center for Atmospheric Particle Studies, Carnegie Mellon University*

11:45-12:00 pm.....Coffee

Platform Aerosol Chemistry 2

12:00-12:30 pm.....**Invited Talk: Processes Relevant to Aerosol Formation from First Principles Based Theory and Electrospray Ionization Mass Spectrometry Experiment,** WILLIAM A. GODDARD III, Himanshu Mishra, Shinichi Enami, Robert J. Nielsen, Michael R. Hoffmann and Agustín J. Colussi, *California Institute of Technology*

12:30-12:50 pm.....**Chemical characterization of particulate matter (PM2.5 and TPS) and their influences on health and environment,** VINÍCIUS MATEUS LIONEL, Isabela Luizi Gonçalves Monteiro, Tatiana Dillenburg Saint'Pierre, Adriana Gioda, *Pontifical Catholic University of Rio de Janeiro*

12:50-1:10 pm.....**Study of Aerosol Black carbon and Aerosol optical Depth over Ranchi during winter in Northern India,** MANOJ KUMAR, *Birla Institute of Technology,Mesra, author-Kumari Lipi*

1:00-2:00 pm Lunch

2:00-3:30 pm..... Tutorials (in parallel)

1. **Diesel Engine Emissions Control –** Antonio H. Miguel, *The Huntington Botanical Gardens*
2. **Aerosol Science and Technology in Materials Synthesis –** Renato P. Camat, *University of Alabama at Birmingham*
3. **Ambient Organic Aerosols –** Sulekha Chattopadhyay, *Independent Air Quality Professional*
4. **Field Studies: Design Considerations for Launching a Successful Campaign –** Arantza Eiguren-Fernandez*, Aerosol Dynamics*
5. **Introduction to Aerosol Mechanics –** Richard Flagan, *California Institute of Technology*

THURSDAY – AUGUST 4

8:00-6:00 pm.....Local registration
8:30-9:00 am.....Breakfast
10:00-4:00 pm.....Exhibitors Open
9:00-10:00 am..... Plenary Lecture
Health effects of ambient air pollution, NELSON GOUVEIA, *Departamento de Medicina Preventiva – Faculdade de Medicina da USP*
10:00-10:15 am.....Coffee

10:15-11:45 am.... Session 6

6A – Health Effects – Nelson Gouveia (Chair) and Simone G.E. K. Miraglia (Co-Chair)

10:15-10:45 am.....Kick-off session:
Air Pollution and Health Impacts in Diadema, São Paulo: a retrospective and critical analysis, SIMONE GEORGES EL KHOURI MIRAGLIA, Pedro Garcia Giacon, Gabriela dos

Santos Fernandes, Leonardo Gonçalves Ruivo, *Universidade Federal de São Paulo - UNIFESP*

Platform Aerosols and Health Effects

10:45-11:05 am.....**Selection of Priority Areas for Surveillance in Health and Environment: Rondônia - Amazônia Brasileira,** POLIANY RODRIGUES, Eliane Ignotti, Sandra Hacon, *Escola Nacional de Saude Pública Sergio Arouca (ENSP/FIOCRUZ)*

11:05-11:25 am.....~~**Prevalence of asthma and rhinitis in schoolchildren in the metropolitan area of Vitoria-ES, Brazil,** FARADIBA SARQUIS SERPA, Jane Meri Santos, Neyval Costa Reis Jr, *Universidade Federal do Espírito Santo* (Moved to Poster Session 2 – Health)~~

11:25-11:45 am.....**Risk Assessment of exposure by PM2.5 from the biomass burning in the Subequatorial in children of Brazilian Amazon: estimative of potential dose and risk toxicology,** BEATRIZ FATIMA ALVES OLIVEIRA, Eliane Ignotti, Sandra Hacon, *Escola Nacional de Saúde Pública/FIOCRUZ*

11:45-1:30 pm Lunch

1:30-2:30 pm.....**Plenary Lecture**
Pulmonary Health Effects of Air Pollution: Particulate Matter and Allergic Arway Inflammation, NING LI, *University of California Los Angeles*

2:30-2:45 pm.....Coffee

2:45-3:55 pm..... Session 7

7A – Microenvironments and Bioaerosols – Benigno Sanchez (Chair) and Sergio Machado (Co-Chair)

2:45-3:15 pm.....Kick-off session
Indoor Air and Bioaerosols: Actual Situation and Perspectives, BENIGNO SANCHEZ, *Energy, Environmental, and Technological Research Center (CIEMAT)*

Platform Microenvironments and Bioaerosols

3:15-3:35 pm.....**Airborne microorganisms associated with plastic sorting facilities,** MARTA VASCONCELOS PINTO, Paulo Fernandes, Sérgio Gonçalves, Joana Guerreiro, Carla Ramos, Manuela Vaz Velho, *Escola Superior de Tecnologia da Saúde de Coimbra*

3:35-3:55 pm.....**TiO2 on polymeric supports for the photocatalytic removal of Formaldehyde in indoor air,** Monique Seufitellis Curcio, Michel Picanço, Walter Ruggeri Waldman, Benigno Sánchez, MARIA CRISTINA CANELA, *Grupo de Pesquisa em Química Ambiental-UENF*

4:00-6:00 pm.....**Petrobras Project—Quantifying the sources of Air Pollutants in São Paulo and Rio de Janeiro and the Importance of Vehicular Sources to Air Quality,** Gisele Birman Tonietto (Coordinator)

4:10-6:00 pm..... Poster Session 2

Aerosols, Clouds and Climate, and Aerosol Physics

- **Effect of the aerosol particles emitted by biomass burning on the solar radiation reaching the surface at Reserva Biologica do Jaru,** BIANCA LOBO SILVA, Marcia Akemi Yamasoe, *Instituto de Astronomia, Geofísica e Ciências Atmosféricas - Universidade de São Paulo*
- **Air quality across Sweden during long-range transport biomass burning pollution episodes,** ADMIR CRESO TARGINO, Patricia Krecl, Christer Johansson, *Universidade Tecnológica Federal do Paraná*
- **Spatial variability of the direct radiative forcing due to biomass burning aerosols and evaluation of the Amazon's land-use change radiative forcing,** ELISA SENA, Alexandre Correia, Paulo Artaxo, *University of São Paulo*
- **Aerosol optical properties in Amazon and the transition from dry to wet season,** KENIA T. WIEDEMANN, Steven C. Wofsy, Meinrat O. Andreae, Paulo Artaxo, Alexandre L. Correia, Christoph Gerbig, *University of São Paulo*
- **Impact of the Unusual Dust Haze on Regional Climate of Sub-Sahel West Africa,** KEHINDE OLUFUNSO OGUNJOBI, Vincent Ola Ajayi, *Federal University of Technology*
- **Study of direct and indirect aerosol radiative forcing over clouds using remote sensing measurements,** FELIPE FÁBIO FRIGERI, Alexandre Lima Correia, *Instituto de Física - Universidade de São Paulo*
- **SERENA Project: remote sensing of cloud microphysical structure and its interaction with atmospheric aerosols,** ALEXANDRE L. CORREIA, Felipe F. Frigeri, J Vanderlei Martins, Paulo Artaxo, *Institute of Physics, University of São Paulo*
- **Hurricanes induce an "Aerosol Low" prior to their formation over the oceans,** RAHUL REDDY, *Indian Institute of Tropical Meteorology*
- **Study of Aerosol black carbon and Aerosol optical Depth over Ranchi during winter in Northern India,** MANOJ KUMAR, Kumari Lipi, *Birla Institute of Technology,Mesra, author-Kumari Lipi*
- **Short-Range Climatology of Aerosol Regimes in Certain Localities in South America**, ERICO AUGUSTO LEIVA, *IAG-USP*

Microenvironments and Bioaerosols

- **Organic composition of particulate matter (PM10) in school classrooms and outdoor air,** CELIA A. ALVES, Priscilla N. Pegas, Teresa F.V. Nunes, Sónia Vieira, Joana Silva, Margarita Evtyugina, Casimiro A. Pio, *CESAM, University of Aveiro*
- **Indoor naphthalene in public restrooms of Rio de Janeiro,** SERGIO MACHADO CORREA, *State University of Rio de Janeiro*
- **Seasonal characterization of fungal bioaerosols in two buildings of different ages in Madrid, Spain,** Marta Sánchez-Muñoz, María Muñoz-Vicente, Aldo González, BENIGNO SÁNCHEZ, *Energy, Environmental, and Technological Research Center (CIEMAT)*
- **Comparative study of three single-stage impaction-based air samplers for bioaerosols quantification: Duo Sas Super 360, Sampl'air and Spin Air,** Marta Sánchez-Muñoz, María Muñoz-Vicente, Raquel Portela, BENIGNO SÁNCHEZ, *Energy, Environmental, and Technological Research Center (CIEMAT)*

Aerosol Modeling

- **Inorganic Fine Particles Formation in an Urban Atmosphere: the example of São Paulo.,** TACIANA TOLEDO DE ALMEIDA ALBUQUERQUE, Maria de Fatima Andrade, Rita Yuri Ynoue, Jason West, *Federal University of Espirito Santo*
- **Accuracy Evaluation of the of regulatory models WRF and AERMOD in the representation of PM10 dispersion: Case study in Marília – SP,** GIULIA SALVE, Daniel Constantino Zacharias, Maria Fátima Andrade, *IAG - USP*
- **WRF/chem modeling application for tropospheric ozone: a case study from October 2002,** WAGNER GALICHIO, Adalgiza Fornaro, *Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Universidade de São Paulo*

Health

- **Genotoxicity and composition of organic particulate matter from biomass burning in a brazilian amazon region,** NILMARA OLIVEIRA ALVES, Ana Lúcia Matos Loureiro, Marcos Felipe Oliveira Galvão, Fernando Cavalcante dos Santos, Kátia Halter Nascimento, Paulo Artaxo, Pérola de Castro Vasconcellos, Sandra de Souza Hacon, Silvia Regina Batistuzzo de Medeiros, *Universidade Federal do Rio Grande do Norte*
- **Biomonitoring of genotoxic activity and assessment of the components of PM2.5 from artisanal cashew nut roasting,** MARCOS FELIPE DE OLIVEIRA GALVÃO, Thiago Melo Cabral, Paulo Afonso de André, Maria de Fátima Andrade, Regina Maura de Miranda, Paulo Hilário Nascimento Saldiva, Silvia Regina Batistuzzo de Medeiros, *Departamento de Biologia Celular e Genética, Centro de Biociências, Universidade Federal do Rio Grande do Norte, Campus Universitário*
- **Effect of short-term changes in particulate air pollution on mortality in Tula – Tepeji, an industrial region of Mexico,** EVA MARGARITA MELGAR-PANIAGUA, Stephen Rothenberg, Andrea M. G. De Vizcaya Ruiz, *Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional*
- **Prevalence of asthma and rhinitis in schoolchildren in the metropolitan area of Vitoria-ES, Brazil,** FARADIBA SARQUIS SERPA, Jane Meri Santos, Neyval Costa Reis Jr, *Universidade Federal do Espírito Santo*

Material Synthesis

- **Gas Phase Laser Synthesis of Calcium Phosphate Nanoparticles for Biomedical Applications,** Parimal V. Bapat, RENATO P. CAMATA, *Universidade Federal do ABC and University of Alabama at Birmingham*

FRIDAY –AUGUST 5

8:00-10:00 am.....Local registration
8:30-9:00 am.....Breakfast
10:00-4:00 pm.....Exhibitors Open
9:00-10:00 am..... Plenary Lecture
Study of the Radiative Effect of Smoke in the Southwestern Portion of the Amazon Basin, MARCIA AKEMI YAMASOE, Nilton Manuel Évora do Rosário, Renato Kerches

Braghiere, Bianca Lobo Silva, *Instituto de Astronomia, Geofísica e Ciências Atmosféricas - USP*

10:00-10:15 am.....Coffee

10:15-11:05 am.... Session 8

8A – Aerosols and Environment – Jose Marcus Godoy (Chair) and Darrel Baumgardner (Co-Chair)

10:15-10:45 am.....Kick-off session:
Atmospheric aerosols in the context of the changing environment of central São Paulo State, ANDREW GEORGE ALLEN, *São Paulo State University*

Platform Aerosols and Environment

10:45-11:05 am.....**Inflorescence Composition of Volatile Emissions of Amorphophallus titanum (Araceae),** JiYi Lee, Douglas A. Lane, John Trager, ANTONIO H. MIGUEL, *The Huntington Botanical Gardens*

11:25-12:15 pm.... Closing remarks
Adjourn

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