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## Award Abstract #0701013

## International Research Fellowship Program: Chamber Studies and Field Analysis of Organic Aerosol with High Resolution Aerosol Mass Spectrometry Statistical Techniques

NSF Org: [OISE](#)  
[Office of International Science and Engineering](#)

Initial Amendment Date: July 2, 2007

Latest Amendment Date: September 4, 2009

Award Number: 0701013

Award Instrument: Fellowship

Program Manager: Susan Parris  
 OISE Office of International Science and Engineering  
 O/D OFFICE OF THE DIRECTOR

Start Date: October 1, 2007

Expires: March 31, 2010 (Estimated)

Awarded Amount to Date: \$121544

Investigator(s): Peter DeCarlo decarlo@colorado.edu (Principal Investigator)

Sponsor: DeCarlo Peter F  
 Boulder, CO 80305 / -

NSF Program(s): EAPSI

Field Application(s): 0000099 Other Applications NEC

Program Reference Code(s): OTHR, 5980, 5979, 5956, 5950, 0000

Program Element Code(s): 7316

### ABSTRACT

0701013

DeCarlo

The International Research Fellowship Program enables U.S. scientists and engineers to conduct nine to twenty-four months of research abroad. The program's awards provide opportunities for joint research, and the use of unique or complementary facilities, expertise and experimental conditions abroad.

This award will support a twenty-four-month research fellowship by Dr. Peter F. DeCarlo

to work with Dr. Urs Baltensperger at the Paul Scherrer Institut in Switzerland.

Aerosols in the atmosphere have been shown to have adverse effects on climate, visibility, and human health. Currently, the direct and indirect effects of aerosols represent the largest source of uncertainty in our understanding of the climate system. The organic component of ambient aerosol, which can make up a significant fraction of the aerosol mass, is poorly characterized due to the complexity of the compounds in organic aerosol. Organic aerosol is comprised of both primary emissions and secondary formation of compounds that condense to the particle phase. Much of the limited understanding of organic aerosol is due to our limited ability to measure the size and chemistry of these particles with high time resolution. Recent advances in aerosol instrumentation including aerosol mass spectrometers allow for a more detailed look at these aerosol properties. One instrument in particular, the High Resolution Time-of-Flight Aerosol Mass spectrometer, represents a significant step forward in our ability to measure the size resolved chemistry of ambient aerosol particles. This instrument will be used to study ambient atmospheric particles in Switzerland and particles generated in a state-of-the-art environmental chamber at the Paul Scherrer Institut (PSI) in Switzerland, building on previous work undertaken by the group at PSI. Measurements of ambient aerosols allow us to passively observe organic aerosols and the processes they undergo in the atmosphere. In contrast environmental chambers allow scientists to actively simulate the atmosphere in controlled experiments to gain insight into particle chemistry, formation, and growth. Combining advanced aerosol instrumentation with ambient observations and chamber experiments will increase our understanding of organic aerosols and the processes that they undergo in the atmosphere. This will allow for better quantification of the effects of aerosols on climate, health, and visibility.

#### PUBLICATIONS PRODUCED AS A RESULT OF THIS RESEARCH

DeCarlo, P. F; Ulbrich, I. M; Crounse, J; de Foy, B; Dunlea, E. J; Aiken, A. C; Knapp, D; Weinheimer, A. J; Campos, T; Wennberg, P. O; Jimenez, J. L; . "Investigation of the sources and processing of organic aerosol over the Central Mexican Plateau from aircraft measurements during MILAGRO," *Atmospheric Chemistry and Physics*, v.10, 2010, p. 5257-5280.

Fierz-Schmidhauser, R; Zieger, P; Gysel, M; Kammermann, L; DeCarlo, P. F; Baltensperger, U; Weingartner, E; . "Measured and predicted aerosol light scattering enhancement factors at the high alpine site Jungfraujoch," *Atmospheric Chemistry and Physics*, v.10, 2010, p. 2319-2333.

Hildebrandt, L; Engelhart, G. J; Mohr, C; Kostenidou, E; Lanz, V. A; Bougiatioti, A; DeCarlo, P. F; Prevot, A. S. H; Baltensperger, U; Mihalopoulos, N; Donahue, N. M; Pandis, S. N; . "Aged organic aerosol in the Eastern Mediterranean: the Finokalia Aerosol Measurement Experiment-2008," *Atmospheric Chemistry and Physics*, v.10, 2010, p. 4167-4186.

#### CONFERENCE PROCEEDINGS PRODUCED AS A RESULT OF THIS RESEARCH

DeCarlo, PF; Chirico, R; Heringa, MF; Tritscher, T; Gysel, M; Weingartner, E; Prevot, ASH; Baltensperger, U. "Smogchamber investigations of primary and secondary organic aerosol from combustion sources," in *19th Annual VM Goldschmidt Conference.*, v.73, 2009, p. A272-A272. [View record at Web of Science](#)

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