

**Dr. Timothy H. Bertram**  
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Department of Chemistry and Biochemistry  
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**Education:**

**University of California**, Berkeley, CA  
**Colby College**, Waterville, ME

Ph.D. Physical Chemistry, December 2006  
B.A. Chemistry, May 2000

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**Professional Experience:**

University of Washington / JISAO, Department of Atmospheric Sciences, Seattle, WA  
NOAA Climate and Global Change Postdoctoral Fellow with Joel Thornton and Thomas Ackerman, [October 2007 – August 2009]  
University of California, Department of Chemistry, Berkeley, CA  
Postdoctoral Fellow with Ronald C. Cohen [December 2006 – October 2007]  
Graduate Research Assistant with Ronald C. Cohen [2001-2006]  
University of Hawaii, School of Ocean and Earth Science and Technology, Honolulu, HI  
Research Technician with Barry Huebert [2000-2001]  
Colby College, Department of Chemistry, Waterville, ME  
Research Assistant with D. Whitney King [1998-2000]  
NOAA, Aeronomy Group, Boulder, CO  
PHASE Student Fellow with Dan Murphy [Summer 1999]

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**Awards:**

NASA New Investigator Award (2012)  
NSF CAREER Award (2012)  
DOE Early Career Award (2011)  
NOAA Climate and Global Change Postdoctoral Fellowship (2007-2009)  
IGAC Outstanding Paper Award (2008)  
AGU Outstanding Paper Award (2007)  
ACCESS IX Participant, Yellowstone National Park (2007)  
NSF International Research Postdoctoral Fellowship (Declined 2007)  
Berkeley Atmospheric Science Center Graduate Fellowship (2005-2006)  
NASA Group Achievement Award (INTEX-NA, TC4) (2004, 2008)  
Berkeley Outstanding Graduate Student Instructor (2004-2005)  
ACS Undergraduate Award in Analytical Chemistry (1999)

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**Synergistic Activities:**

Associate Director, Center for Aerosol Impacts on Climate and the Environment (CAICE)  
Co-editor Atmospheric Chemistry and Physics 2009 – present  
Symposium Organizer, 2012 Fall ACS meeting (PHYS)  
NASA Student Airborne Research Program (2012, 2013)  
Member, American Geophysical Union, American Chemical Society  
Manuscript reviewer for Journal of Physical Chemistry, Atmospheric Chemistry and Physics, Geophysical Research Letters, Atmospheric Environment, and Analytical Chemistry.  
Proposal reviewer for NSF, NASA, DOE and NOAA

## Teaching:

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### Current teaching:

Environmental Chemistry (Fall quarter; CHEM 171): 75 students

General Chemistry (Spring quarter; CHEM 6C): 275 students

## Field Research:

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HiWinGS: High Wind Gas Exchange Study, *R/V Knorr*, North Atlantic (2013) ‡

SARP: Student Airborne Research Program, NASA Dryden (2013) \*

SOAS: Southern Oxidant and Aerosol Study, Look Rock TN (2013) †

CalNex: California Nexus, *R/V Atlantis*, Coastal California (2010) ‡

NORAA: N<sub>2</sub>O<sub>5</sub> Reactivity on Ambient Aerosol, Boulder, Seattle, and San Diego (2007-2009) †

TC4: Tropospheric Clouds, Chemistry and Convection, San Jose, Costa Rica (2007) \*

MILAGRO / INTEX-B, Houston, TX, Honolulu, HI, and Anchorage, AK (2006) \*

PAVE: Polar AURA Validation Experiment, Portsmouth, NH (2005) \*

INTEX-NA: Intercontinental Transport Experiment –North America, Portsmouth, NH (2004) \*

ACE-Asia: Aerosol Characterization Experiment-Asia, Iwakuni, Japan (2001) \*

PELTI: Passing Efficiency of an Airborne Low Turbulence Aerosol Inlet, St Croix, U.S.V.I. (2000) \*

(†Ground ‡Research Vessel \* Aircraft)

## Funding:

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### Current

*In situ measurements of heterogeneous reactions on ambient aerosol particles: Impacts on atmospheric chemistry and climate*, DOE, Bertram (PI), \$770k (2011-2016)

*CAREER: Air-sea exchange of volatile organic compounds: Impacts on climate and atmospheric chemistry*, NSF, \$668k Bertram (PI) (2012-2017)

*A compact, low-cost, network accessible, optical particle counter for the real time measurement of submicron aerosol particle size distributions*, EPA, \$250k, (2012-2014)

*Simultaneous, fast time response aircraft observations of volatile organic compounds: New constraints for satellite based measurements and a unique opportunity for education and outreach*, NASA, Bertram (PI), \$331k, (2012-2015)

*Understanding Primary Organic Aerosol Volatility at Atmospherically Realistic Concentrations for SIP Analysis*, CARB, \$50k to THB, (2011-2013)

*DOE SBIR Phase II: Chemical Ionization Time-of-Flight Mass Spectrometer for Particle- and Gas-phase Organic Speciation*, DOE SBIR, \$50k to THB, Aerodyne (PI), (2011-2013)

*CCI- Chemistry effects on climate: Heterogeneous reactions on complex atmospheric aerosol particles*, NSF, \$20 million total, Prather (PI)

## Advising:

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### Postdoctoral Fellows

Katherine Zimmermann (Ph.D, UC Riverside)

Matthew Zoerb (Ph.D, UC Berkeley)

### Ph.D. Students

Olivia Ryder: Thesis and Research Advisor, expected graduation Spring 2015  
Timia Crisp: Thesis and Research Advisor, expected graduation Spring 2015  
James Brady – Thesis and Research Advisor, expected graduation Spring 2016  
Michelle Kim – Thesis and Research Advisor, expected graduation Spring 2016  
Nicole Campbell – Thesis and Research Advisor, expected graduation Spring 2018  
Steve Schill – Thesis and Research Advisor, expected graduation Spring 2018

### Undergraduate Research Students (UCSD)

Angie Ta – Faculty research advisor for CHEM 199  
David Navarro – Faculty research advisor for CHEM 199 and ESYS 190  
Kevin Tran – Faculty research advisor for ESYS 190  
Daniel Reynolds - Faculty research advisor for CHEM 199  
Michelle Larkin McMurtry - Faculty research advisor for CHEM 199  
Allen Huang - Faculty research advisor  
Abe Wu - Faculty research advisor  
Yohanna Bernardo- Faculty research advisor

### Summer Undergraduate Research Students

David Goetsch (Northwestern University)  
Matthew Go (University of Chicago)

### Advisors:

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**Ph.D. Advisor:** Ronald C. Cohen

(University of California, Berkeley)

**Postdoctoral Advisor:** Joel A. Thornton

(University of Washington)

### Peer Reviewed Publications

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#### Under Review

J.M. Brady, T. Crisp, S. Collier, T. Kuwayama, Q. Zhang, M. J. Kleeman and **T. H. Bertram**, Real-time emission factor measurements of isocyanic acid from light duty vehicles *under review at Env. Sci. Tech.*

M. Kim, D.K. Farmer, **T.H. Bertram**, A controlling role for the air-sea interface in the chemical processing of reactive nitrogen in the coastal marine boundary layer *under review at PNAS*

T. Guasco, L. Cuadra-Rodriguez, B. Pedler, A. Ault, D. Collins, D. Zhao, M. Kim, M. Ruppel, S. Wilson, R. Pomeroy, V. Grassian, F. Azam, **T.H. Bertram**, K. A. Prather, Transition metal associations with primary biological particles in sea spray aerosol *under review at Env. Sci. Tech.*

T.A. Crisp, B.M. Lerner, E. J. Williams, P. K. Quinn, T. S. Bates, **T.H. Bertram**, Gas-phase hydrochloric acid in the polluted marine boundary layer: Potential role of primary sources and implications for the chlorine atom budget *under review at J. Geophys. Res.*

O.S. Ryder, A. Ault, J. F. Cahill, T. L. Guasco, L. Cuadra-Rodriguez, C. Gaston, E. Fitzgerald, C. Lee, K.A. Prather and **T.H. Bertram**, On the role of particle inorganic mixing state in the reactive uptake of N<sub>2</sub>O<sub>5</sub> to ambient aerosol particles *under review at Env. Sci. Tech.*

#### In Press

A. Ault, T. L. Guasco, O. Ryder, J. Baltrusaitis, L. A. Cuadra-Rodriguez, D. B. Collins, M. J. Ruppel, **T.H. Bertram**, K. A. Prather, and V. H. Grassian, Impacts of Heterogeneous Reactions of NO<sub>y</sub> on the Chemical Composition and Internal Structure of Sea Spray Aerosol *accepted JACS*

## **2013**

C. Ebben, A. Ault, M. Ruppel, O.S. Ryder, **T.H. Bertram**, V. Grassian, K. Prather, F. Geiger, Size-Resolved Sea Spray Aerosol Particles Studied by Vibrational Sum Frequency Generation, *JPC (accepted)*, 2013.

**T.H. Bertram**, A.E. Perring, P.J. Wooldridge, J. Dibb, M.A. Avery, R.C. Cohen, On the export of reactive nitrogen from Asia: NO<sub>x</sub> partitioning and effects on ozone, *ACP 13*, 1-14, 2013.

K.A. Prather, **T.H. Bertram** et al, Bringing the ocean into the laboratory to probe the chemical complexity of sea spray aerosol, *PNAS 110 (19)* 7550-5, 2013.

A.P. Ault, R.C. Moffet, J. Baltrusaitis, D.B. Collins, M.J. Ruppel, L.A. Cuadra-Rodriguez, D. Zhao, T.L. Guasco, C.J. Ebben, F.M. Geiger, **T.H. Bertram**, K.A. Prather, V.H. Grassian, Size-dependent changes in sea spray aerosol composition and properties with different seawater conditions, *Environ. Sc. and Tech 47 (11)* 5603-5612, 2013.

D.B. Collins, A.P. Ault, R.C. Moffet, M.J. Ruppel, L.A. Cuadra-Rodriguez, T.L. Guasco, C.E. Corrigan, B.E. Pedler, F. Azam, L.I. Aluwihare, **T.H. Bertram**, G.C. Roberts, V.H. Grassian, K.A. Prather, Impact of marine biogeochemistry on the chemical mixing state and cloud forming ability of nascent sea spray aerosol *J. Geophys. Res (accepted)*, 2013.

M.D. Stokes, G.B. Deane, K.A. Prather, **T.H. Bertram**, M.J. Ruppel, O.S. Ryder, J.M. Brady, D. Zhao, A marine aerosol reference system as a breaking wave analogue for the production of foam and sea-spray aerosols *Atmos. Meas. and Tech*, 6 1085-1094., 2013.

## **2012**

TP Riedel, **TH Bertram**, OS Ryder, S Liu, DA Day, LM Russell, CJ Gaston, KA Prather, and JA Thornton, *Direct N<sub>2</sub>O<sub>5</sub> reactivity measurements at a polluted coastal site*. Atmospheric Chemistry and Physics, 12, 2959-2968, 2012.

TP Riedel, **TH Bertram**, TA Crisp, EJ Williams, BM Lerner, A Vlasenko, SM Li, J Gilman, J de Gouw, DM Bon, NL Wagner, SS Brown, and JA Thornton, *Nitryl Chloride and Molecular Chlorine in the Coastal Marine Boundary Layer*. Environmental Science and Technology, 2012

RLN Yatavelli, F Lopez-Hilfiker, Julia D. Wargo, JR Kimmel, MJ Cubison, **TH Bertram**, JL Jimenez, M Gonin, DR Worsnop, and JA Thornton, *A Chemical Ionization High-Resolution Time-of-Flight Mass Spectrometer Coupled to a Micro Orifice Volatilization Impactor (MOVI-HRToF-CIMS) for Analysis of Gas and Particle-Phase Organic Species*. Aerosol Science and Technology, 2012

## **2011**

**TH Bertram**, J.R. Kimmel, OS Ryder, T.A. Crisp, M.J. Cubison, M. Gonin, R. Yatavelli, J. A. Thornton, and D. R. Worsnop, *A compact, field-deployable, chemical ionization time-of-flight mass spectrometer: application to the measurement of gas-phase organic and inorganic acids*. Atmospheric Measurement Techniques, 4, 1471-1479, 2011.

## **2010**

T. W. Walker, R. V. Martin, A. van Donkelaar, W. R. Leitch, A. M. MacDonald, K. G. Anlauf, R. C. Cohen, T. H. **Bertram**, L. G. Huey, M. A. Avery, A. J. Weinheimer, F. M. Flocke, D. W. Tarasick, A. M. Thompson, D. G. Streets, and X. Liu, *Trans-Pacific transport of reactive nitrogen and ozone to Canada during spring*, Atmospheric Chemistry and Physics Discussions, 10, 8717-8764, 2010

P. J. Wooldridge, A. E. Perring, **T. H. Bertram**, F. M. Flocke, J. M. Roberts, H. B. Singh, L. G. Huey, J. A. Thornton, G. M. Wolfe, J. G. Murphy, J. L. Fry, A. W. Rollins, B. W. LaFranchi, and R. C. Cohen, *Total Peroxy Nitrates ( $\Sigma$ PNs) in the atmosphere: the Thermal Dissociation-Laser Induced Fluorescence (TD-LIF) technique and comparisons to speciated PAN measurements*, *Atmospheric Measurement Techniques Discussions*, 3, 593-607, 2010

## **2009**

**T.H. Bertram**, J.A. Thornton, T.P. Reidel, An Experimental Technique for the Direct Measurement of N<sub>2</sub>O<sub>5</sub> Reactivity on Ambient Particles, *Atmos. Meas. Tech.*, 2, 231-242, 2009.

**T.H. Bertram** and J.A. Thornton, Toward a general parameterization of N<sub>2</sub>O<sub>5</sub> reactivity on aqueous particles: the competing effects of particle liquid water, nitrate and chloride, *Atmos. Chem. Phys. Disc.*, 9, 15181-15214, 2009.

**T.H. Bertram** et al., Direct Observations of N<sub>2</sub>O<sub>5</sub> Reactivity on Ambient Aerosol Particles, *Geophysical Research Letters*, 2009.

A.E. Perring, **T.H. Bertram**, P.J. Wooldridge, A. Freid, B. Heikes, M. Avery, J. Dibb, J. Crouse, P.O. Wennberg, N.J. Blake, D. Blake, W.H. Brune, and R.C. Cohen, *Airborne observations of total RONO<sub>2</sub>: new constraints on the yield and lifetime of isoprene nitrates*, *Atmos. Chem. Phys.*, 9, 1451-1463, 2009.

O.R. Cooper, S. Eckhardt, J.H. Crawford, C.C. Brown, R.C. Cohen, **T.H. Bertram**, P. Wooldridge, A. Perring, W.H. Brune, X. Ren, D. Brunner, and S. Baughcum, *The Summertime Buildup and Decay of Lightning NO<sub>x</sub> and Aged Thunderstorm Outflow above North America*, *J. Geophys. Res.*, 114, D01101, doi:10.1029/2008JD010293, 2009.

A.E. Perring, **T.H. Bertram**, D.K. Farmer, P.J. Wooldridge, J. Dibb, N.J. Blake, D.R. Blake, H.B. Singh, H. Fuelberg, G. Diskin, G. Sachse, R.C. Cohen, *Alkyl nitrate production and persistence in the Mexico City Plume*, *Atmos. Chem. Phys. Discus.*, 9, 23755-23790, 2009.

## **2008**

E.J. Buscela, A.E. Perring, R.C. Cohen, K.F., Boersma, E.A. Celarier, J.F. Gleason, M.O. Wenig, **T.H. Bertram**, P.J. Wooldridge, T. Dirksen and J.P. Veefkind, Comparison of Tropospheric NO<sub>2</sub> from in situ aircraft Measurements with Near-Real Time and Standard-Product Data from OMI, accepted *J. Geophys. Res.*, 2008.

K.F. Boersma, D.J. Jacob, E.J. Buscela, A.E. Perring, R. Dirksen, R.J. van der A, R.M. Yantosca, R.J. Park, M.O. Wenig, **T.H. Bertram** and R.C. Cohen, Validation of OMI Tropospheric NO<sub>2</sub> Observations during INTEX-B and application to constrain NO<sub>x</sub> Emissions over the Eastern United States and Mexico, *Atmos. Environment* 2008.

## **2007**

S. Kim, L.G. Huey, R.E. Stickel, D.J. Tanner, J. H. Crawford, J. R. Olson, G. Chen, W. H. Brune, X. Ren, R. Leshner, P. J. Wooldridge, **T.H. Bertram**, A. Perring, R. C. Cohen, B. B. Lefer, R. E. Shetter, M. Avery, G. Diskin, and I. Sokolik, *Measurement of HO<sub>2</sub>NO<sub>2</sub> in the Upper Troposphere during ICARRT-INTEX-NA 2004*, *J. Geophys. Res.* 2007.

R.C. Hudman, D.J. Jacob, S. Turquety, E.M. Leibensperger, L.T. Murray, S. Wu, A.B. Gilliland, M.A. Avery, G.W. Sachse, **T.H. Bertram**, R.C. Cohen, P.J. Wooldridge, A.E. Perring, W.H. Brune, X.R. Ren, J.E. Dibb, F.M. Flocke, A. Fried, J.S. Holloway, A. Newman, T.B. Ryerson, R. Orville, H.B. Singh, *Surface and lightning sources of nitrogen oxides in the United States: magnitudes, chemical evolution and outflow*, *J. Geophys. Res.* 2007.

**T.H. Bertram**, A.E. Perring, P.J. Wooldridge, J.D. Crouse, A.J. Kwan, P.O. Wennberg, E. Scheuer, J. Dibb, M. Avery, G. Sachse, S.A. Vay., J.H. Crawford, C.S. McNaughton, A. Clarke, K.E. Pickering, H. Fuelberg, G. Huey, D.R. Blake,

H.B. Singh, S.R. Hall, R.E. Shetter, A. Fried, B.G. Heikes and R.C. Cohen, *Direct Measurement of the Convective Recycling of the Upper Troposphere*, Science, 4 January 2007, DOI: 10.1126/science.1134548

H.B. Singh, L. Salas, D. Herlth, E. Czech, M. Avery, J.H. Crawford, R.B. Pierce, G.W. Sachse, D.R. Blake, R.C. Cohen, **T.H. Bertram**, A. Perring, P.J. Wooldridge, J. Dibb, G. Huey, R.C. Hudman, S. Turquety, L.K. Emmons, F. Flocke, Y. Tang, G.R. Carmichael, L.W. Horowitz, *Reactive Nitrogen Distribution and Partitioning in the North American Troposphere and Lowermost Stratosphere*, J. Geophys. Res. 2007.

A. Fried, J. Walega, J. Olson, J. Crawford, G. Chen, P. Weibring, D. Richter, C. Roller, F. Tittel, M. Porter, H. Fuelberg, J. Halland, **T.H. Bertram**, R. Cohen, K. Pickering, B. Heikes, J. Snow, H. Shen, D. O'Sullivan, W. Brune, X. Ren, D. Blake, N. Blake, G. Sachse, G. Diskin, J. Podolski, S. Vay, R. Shetter, B. Anderson, L. Thornhill, A. Clarke, C. McNaughton, H. Singh, M. Avery, G. Huey, D. Millet, and D. Jacob, *The Role of Convection in Redistributing Formaldehyde to the Upper Troposphere over North America and the North Atlantic during the Summer 2004 INTEX Campaign*, accepted J. Geophys. Res., 2007.

## **2006**

R.V. Martin, C.E. Sirois, K. Chance, T.B. Ryerson, **T.H. Bertram**, P.J. Wooldridge, R.C. Cohen, A.A. Neuman, A. Swanson, F.M. Flocke, *Evaluation of space based constraints on nitrogen oxide emissions with regional aircraft measurements over and downwind of eastern North America*, J. Geophys. Res. 2006.

O. R. Cooper, A. Stohl, M. Trainer, A. Thompson, J. C. Witte, S. J. Oltmans, B. J. Johnson, J. Merrill, J. L. Moody, G. Morris, D. Tarasick, G. Forbes, P. Nidulec, F. C. Fehsenfeld, J. Meagher, M. J. Newchurch, F. J. Schmidlin, S. Turquety, J. H. Crawford, G. Chen, K. E. Pickering, S. L. Baughcum, R. C. Cohen, **T.H. Bertram**, P. Wooldridge, A. Perring, W. H. Brune, N. Spichtinger and C. C. Brown, *Large upper tropospheric enhancements above mid-latitude North America during summer: In situ evidence from the IONS and MOZAIC ozone monitoring networks*, J. Geophys. Res. 2006.

## **2005**

E.C. Wood, T.H. **Bertram**, P.J. Wooldridge, and R.C. Cohen, *Measurements of N<sub>2</sub>O<sub>5</sub>, NO<sub>2</sub> and O<sub>3</sub> East of the San Francisco Bay*, Atmos. Chem Phys. (5) 483-491, 2005.

**T.H. Bertram**, P.M. Chu, and R.C. Cohen, *Comparison of NIST Ozone, Nitric Oxide and Nitrogen Dioxide Standards*, J. Air and Waste Management Assoc., 55, 1473-1479 2005.

C.S. Boxe, A.J. Colussi, M.R. Hoffman, J.G. Murphy, P.J. Wooldridge, T.H. **Bertram**, and R.C. Cohen, *Photochemical Production and Release of Gaseous NO<sub>2</sub> from Nitrate Doped Water Ice*, J. Phys. Chem. B, 2005.

T.H. Bertram, Heckel, A., Richter, A., Burrows, J., and R.C. Cohen, *Satellite measurements of daily variations in soil NO<sub>x</sub> emissions*, Geophys. Res. Lett. 32 L24812, doi:10.1029/2005GL024640 2005.

## **2004**

J. Kline, B. Huebert, S. Howell, **T.H. Bertram**, B. Blomquist, J. Zhuang, and J. Heath, *Aerosol composition and size versus altitude measured from the C-130 during ACE-Asia*, J. Geophys. Res., Vol. 109, No. D19, D19S08 10.1029/2004JD004540, 2004.

B.J. Huebert, **T.H. Bertram**, S. Howell, B. Blomquist, and J. Heath, *Measurements of Organic and Elemental Carbon in the Asian Outflow during ACE-Asia from the NSF/NCAR C-130*, J. Geophys. Res., Vol. 109, No. D19, D19S11 10.1029/2004JD004700, 2004.

B.J. Huebert, S.G. Howell, D. Covert, **T.H. Bertram**, A. Clarke, J.R. Anderson, B.G. Lafleur, W.R. Seebaugh, J.C. Wilson, D. Gesler, B. Blomquist, J. Fox, *PELTI: Measuring the Passing Efficiency of an Airborne Low Turbulence Aerosol Inlet*, *Aerosol Science and Technology*, 38:803-826, 2004.

Y. Ma, R.J. Weber, K. Maxwell-Meier, D.A. Orsini, Y.N. Lee, B.J. Huebert, S.G. Howell, **T.H. Bertram**, R.W. Talbot, J.E. Dibb, E. Scheuer, *Intercomparisons of airborne measurements of aerosol ionic chemical composition during TRACE-P and ACE-Asia* *J. Geophys. Res.*, Vol. 109, No. D15, D15S06 2004.

### **2003**

K. Kawamura, N. Umemoto, M. Mochida, **T.H. Bertram**, S. Howell and B. Huebert, *Water-soluble Dicarboxylic Acids in Tropospheric Aerosols Collected over East Asia and Western North Pacific during ACE-Asia*, *J. Geophys. Res.*, Vol. 108 NO. D23, 8639, 2003.

B.T. Mader, J.J. Schauer, J.H. Seinfeld, R.C. Flagan, J.Z. Yu, H. Yang, Ho-Jin Lim, B.J. Turpin, J. T. Deminter, G. Heidemann, M. S. Bae, P. Quinn, T. Bates, D.J. Eatough, B.J. Huebert, **T.H. Bertram**, and S. Howell. *Sampling methods used for the collection of particle-phase organic and elemental carbon during ACE-Asia*, *Atmos. Env.* 37 1435-1449, 2003

J.J. Schauer, B.T. Mader, J.T. Deminter, G. Heidemann, M.S. Bae, J.H. Seinfeld, R.C. Flagan, R.A. Cary, D. Smith, B.J. Huebert, **T.H. Bertram**, S. Howell, J.T. Kline, P. Quinn, T. Bates, B. Turpin, H.J. Lim, J.Z. Yu, H. Yang and M.D., Keywood, *ACE-Asia Intercomparison of a Thermal-Optical Method for the Determination of Particle-Phase Organic and Elemental Carbon*, *Env. Sci. and Tech.* 37(5) 993-1001, 2003.