

# Workshop on Nitrate Radicals and Biogenic Volatile Organic Compounds: Oxidation, Mechanisms and Organic Aerosol

Georgia Institute of Technology, Atlanta, GA, USA  
Cloughs Commons Auditorium 152  
June 22 - 24, 2015



## Monday, June 22

- 8:00 AM Continental breakfast
- 8:30 AM Welcoming remarks: Georgia Tech Chemical and Biomolecular Engineering / Earth and Atmospheric Sciences school chairs
- 8:45 AM Introductory remarks: Workshop organizers (Sally Ng, Steve Brown)

### Session 1: Nitrate radical and nitrogen oxide observations

*Chairs: Rebecca Schwantes and Ben Lee*

*Rapporteurs: Neil Donahue and Yinon Rudich*

- 9:00 AM **Plenary** Ulrich Platt, University of Heidelberg, Germany: *Four Decades of Research on  $\text{NO}_3$  in the Atmosphere*
- 9:30 AM Steve Brown, NOAA ESRL, USA: *Nighttime aircraft measurements in polluted, biogenic-emitting regions: What have we learned?*
- 9:50 AM Bin Ouyang, University of Cambridge, UK: *Aircraft observation of  $\text{NO}_3$  in northwest Europe*
- 10:10 AM Hans Osthoff, University of Calgary, Canada: *On the utility of TD-CRDS to monitor  $\text{NO}$ ,  $\text{NO}_2$ ,  $\text{NO}_3$ ,  $\text{N}_2\text{O}_5$ , peroxy and alkyl nitrates*
- 10:30 AM Jochen Stutz, University of California, Los Angeles, USA: *Vertical Variation of  $\text{NO}_3$  chemistry in and above the Nocturnal Boundary Layer*
- 10:50 AM Coffee break

- 11:10 AM     **Keynote**     Ron Cohen, University of California, Berkeley, USA: *Insights into the role of NO<sub>3</sub> & BVOC chemistry from field observations of total and aerosol organic nitrates*
- 11:40 AM     John Crowley, Max Planck Institute for Chemistry, Germany: *NO<sub>3</sub> lifetime measurements*
- 12:00 PM     Lunch
- 1:00 PM     Rob McLaren, York University, Canada: *Field studies of NO<sub>3</sub>, BVOC's and products in the Lower Fraser Valley and Toronto.*
- 1:20 PM     Hartmut Herrmann, Leibniz Institute for Tropospheric Research, Germany: *NO<sub>3</sub> LEAK chamber and aqueous phase studies*
- 1:40 PM     Benedicte Picquet-Varrault, LISA, University of Paris Est Creteil, France: *Gas-phase reactivity of unsaturated aldehydes with NO<sub>3</sub> radicals*
- 2:00 PM     Hendrik Fuchs, Forschungszentrum Jülich, Germany: *Instrumental aspects of ROx-radical measurements by the Juelich LIF instrument during nighttime field experiments*
- 2:20 PM     Breakout group discussions, Session 1 (a, b, c)
- 3:20 PM     Coffee break
- 3:40 PM     Group discussions, Session 1

## **Session 2: Biogenic hydrocarbons and organic nitrogen**

*Chairs: Bin Ouyang and Alma Hodzic*

*Rapporteurs: Jochen Stutz and Julie Fry*

- 4:10 PM     **Keynote**     Rob Griffin, Rice University, USA: *Measurements and Modeling to Evaluate NO<sub>3</sub> Oxidation of BVOCs in Houston*
- 4:40 PM     Rebecca Schwantes, California Institute of Technology, USA: *Isoprene NO<sub>3</sub> Oxidation Products from the RO<sub>2</sub> + HO<sub>2</sub> Pathway*
- 5:00 PM     Brent Williams, Washington University in St. Louis, USA: *Observations and new science questions from a pilot study in the urban St. Louis region, with seasonal impact from the Ozarks isoprene volcano*

5:20 PM Laboratory tour of new chamber facilities at Georgia Tech (Sally Ng)

6:00 PM Adjourn

## **Tuesday, June 23**

8:00 AM Continental breakfast

### **Session 2, Continued**

8:30 AM **Keynote** Jingqiu Mao, Princeton / NOAA GFDL, USA: *Ozone and organic nitrates over the Southeast US*

9:00 AM Deborah Luecken, US EPA: *Consistent treatment of anthropogenic and biogenic nitrates in Air Quality Models*

9:20 AM Alex Archibald, University of Cambridge and NCAS, UK: *Global modelling of NO<sub>3</sub> and BVOC*

9:40 AM Elliot Atlas, University of Miami, USA: *Title TBD*

10:00 AM Coffee break

10:20 AM Ben Lee, University of Washington, USA: *Highly functionalized organic nitrates in the Southeastern U.S.: contribution to secondary organic aerosol and reactive nitrogen budgets*

10:40 AM Nga Lee "Sally" Ng, Georgia Institute of Technology, USA: *SOA and organic nitrate formation from monoterpene+NO<sub>3</sub>: connecting laboratory chamber studies to field measurements*

11:00 AM Breakout group discussions, Session 2 (a, b, c)

12:00 PM Lunch

1:00 PM Group discussions, Session 2

### **Session 3: Nitrate radicals and secondary organic aerosol**

*Chairs: Hendrik Fuchs and Alex Archibald*

*Rapporteurs: Rob McLaren and Deborah Luecken*

- 1:30 PM **Keynote** Astrid Kiendler-Scharr, Forschungszentrum Jülich, Germany: *Nighttime formation of secondary organic aerosol: new evidence for a strong source from NO<sub>3</sub> oxidation*
- 2:00 PM Yinon Rudich, Weizmann Institute, Israel: *The case for studying optical properties of biogenic aerosols from NO<sub>3</sub> reactions*
- 2:20 PM Julie Fry, Reed College, USA: *Chamber Studies of secondary organic aerosol (SOA) yield and composition from NO<sub>3</sub> reactions with monoterpenes*
- 2:40 PM Doug Day, University of Colorado, USA: *Measurements of organic nitrate aerosol from aircraft, with an NO<sub>3</sub> oxidation flow reactor*
- 3:00 PM Marcelo Guzman, University of Kentucky, USA: *The mechanism of β-pinene oxidation by nitrate radicals*
- 3:20 PM Coffee break
- 3:40 PM **Keynote** Havala Pye, US EPA: *Towards mechanistic representations of SOA from BVOC+NO<sub>3</sub> reactions*
- 4:10 PM Alma Hodzic, NCAR, USA: *Biogenic SOA formation and response to NO<sub>x</sub> reductions over the Colorado conifer forest*
- 4:30 PM Rahul Zaveri, Pacific Northwest National Laboratory, USA: *Nighttime organic nitrate aerosol formation during the CARES field campaign*
- 4:50 PM Manabu Shiraiwa, Max Planck Institute for Chemistry, Germany: *Direct quantification of nitrogen-containing compounds in α-pinene secondary organic aerosols*
- 5:10 PM Neil Donahue, Carnegie Mellon University, USA: *Organic aerosol dynamics and some mysteries involving nitrates*
- 5:30 PM Open
- 5:50 PM Adjourn

## **Wednesday, June 23**

- 8:00 AM Continental breakfast
- 9:00 AM Breakout group discussions, Session 3 (a, b, c)
- 10:00 AM Group discussion, Session 3
- 10:30 AM Coffee break
- 10:50 AM Rapporteur's summaries
- 11:20 AM Group discussion: Future directions in NO<sub>3</sub>-BVOC research
- 12:20 PM Closing remarks
- 12:30 PM Adjourn

## Breakout Session Assignments

- 1a. Session Leaders: Elliot Atlas, Rob Griffin  
Session participants: Alex Archibald, Steve Brown, Ron Cohen, John Crowley, Uli platt, Doug Day, Neil Donahue, Julie Fry
- 1b. Session Leaders: Hartmut Herrmann, Marcelo Guzman  
Session participants: Ben Lee, Deborah Luecken, Jingqiu Mao, Hendrik Fuchs, Rob McLaren, Jochen Stutz, Alma Hodzic, Astrid Kiendler-Scharr
- 1c. Session Leaders: Brent Williams, Sally Ng  
Session participants: Rebecca Schwantes, Hans Osthoff, Bin Ouyang, Benedicte Picquet-Varrault, Havala Pye, Yinon Rudich, Manabu Shiraiwa, Rahul Zaveri
- 2a. Session Leaders: Benedicte Picquet-Varrault, Jingqiu Mao  
Session participants: Alex Archibald, Ben Lee, Hartmut Herrmann, Bin Ouyang, Rob McLaren, Alma Hodzic, Marcelo Guzman, Yinon Rudich
- 2b. Session Leaders: John Crowley, Steve Brown  
Session participants: Rebecca Schwantes, Elliot Atlas, Brent Williams, Jochen Stutz, Hans Osthoff, Havala Pye, Neil Donahue, Rahul Zaveri
- 2c. Session Leaders: Doug Day, Ron Cohen  
Session participants: Rob Griffin, Deborah Luecken, Sally Ng, Hendrik Fuchs, Uli Platt, Astrid Kiendler-Scharr, Julie Fry, Manabu Shiraiwa
- 3a. Session Leaders: Hans Osthoff, Havala Pye  
Session participants: Deborah Luecken, Rebecca Schwantes, Rob Griffin, Hartmut Herrmann, Bin Ouyang, Marcelo Guzman, Julie Fry, Neil Donahue
- 3b. Session Leaders: Rahul Zaveri, Astrid Kiendler-Scharr  
Session participants: Brent Williams, Alex Archibald, Elliot Atlas, Hendrik Fuchs, John Crowley, Ron Cohen, Doug Day, Benedicte Picquet-Varrault
- 3c. Session Leaders: Manabu Shiraiwa, Uli Platt  
Session participants: Ben Lee, Jingqiu Mao, Sally Ng, Rob McLaren, Jochen Stutz, Steve Brown, Yinon Rudich, Alma Hodzic