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PROFESSIONAL EXPERIENCE

2001-present **GEOPHYSICAL FLUID DYNAMICS LABORATORY**, Princeton, New Jersey
Physical Scientist

My current research focuses on tropospheric trace gases and aerosols. I use global chemical transport models to simulate the chemical and dynamical processes affecting these species.

1999-2001 **GEOPHYSICAL FLUID DYNAMICS LABORATORY**, Princeton, New Jersey
Visiting Scientist, Atmospheric and Oceanic Sciences Program, Princeton University

My work aimed to improve our understanding of the processes controlling tropospheric trace gas distributions. I used global chemical transport models to study the impact of chemistry and transport on ozone and related chemical species.

1997-1999 **NATIONAL CENTER FOR ATMOSPHERIC RESEARCH**, Boulder, Colorado
Postdoctoral Fellow, Advanced Study Program / Atmospheric Chemistry Division

My research focused on simulating the chemistry of ozone and related species in the troposphere. Using a three-dimensional global model, I studied the dependence of ozone concentrations on emissions of ozone precursors from anthropogenic and natural sources.

EDUCATION

1993-1997 **HARVARD UNIVERSITY**, Cambridge, Massachusetts
Ph.D. in Atmospheric Chemistry/Applied Mathematics, Division of Engineering and Applied Sciences, degree received November 1997
Committee: Professors Daniel Jacob (advisor), Michael McElroy, Steven Wofsy

My research focused on the tropospheric photochemistry of ozone, nitrogen oxides, and non-methane hydrocarbons. I developed a photochemical mechanism describing the reactions occurring within the continental boundary layer and the global troposphere, for use in chemical models. Using a three-dimensional chemical transport model, I examined the impact of non-methane hydrocarbon chemistry on the global distributions of ozone and nitrogen oxides. Thesis title: The influence of boundary layer chemistry on global tropospheric ozone and nitrogen oxides.

1991-1993 **HARVARD UNIVERSITY**, Cambridge, Massachusetts
S.M. in Applied Physics, Division of Applied Sciences

Emphasis on the chemistry and physics of the atmosphere. Additional courses in applied mathematics, including numerical techniques.

Summer 1990 **WEIZMANN INSTITUTE OF SCIENCE**, Rehovot, Israel

Research on spectroscopy in molecular jets, Department of Chemical Physics, Karyn Kupcinet International Science School, funded to attend.

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1987-1991 **HARVARD COLLEGE**, Cambridge, Massachusetts
A.B. summa cum laude in Chemistry
Advisors: Professors Elias Corey, William Klemperer

Extensive coursework in physical and organic chemistry, mathematics, and physics.

ACADEMIC HONORS

1993-1996 **NASA Graduate Student Fellowship in Global Change Research**
Provided funding for tuition, stipend, and travel
1991-1993 **Ernst Habicht Fellowship**, Harvard University
Provided funding for tuition and stipend
1991 Elected to **Phi Beta Kappa**
1987-1991 **John Harvard Scholarship**, Harvard College, for academic achievement

TEACHING EXPERIENCE

2003 **Princeton University Lecturer**, Program in Atmospheric and Oceanic Sciences

Atmospheric Chemistry, co-taught graduate level class (with Hiram Levy II)

1992-1997 **Harvard University Teaching Fellow**, Department of Earth and Planetary Sciences
Taught weekly sections, prepared and graded homeworks and exams

Environmental Sciences, Professors Brian Farrell and Michael McElroy
Chemical Oceanography, Professor Heinrich Holland, graduate-level class
Atmospheric Chemistry, Professor Daniel Jacob
Environmental Pollution, Professors Raymond Siever and Daniel Jacob

Fall 1993 **Harvard University Teaching Fellow**, Undergraduate Core Curriculum Program
Taught weekly sections, prepared and graded homeworks and exams

The Atmosphere, Professors Michael McElroy and Daniel Jacob

1990-1991 **Harvard University Course Assistant**, Department of Mathematics
Taught weekly sections and graded homeworks

Linear Algebra and Differential Equations, Professor Shlomo Sternberg
Multivariable Calculus, Professor David Kazhdan

PROFESSIONAL SERVICE AND AFFILIATIONS

2002-present **Science**, Reviewer
2001-present **Atmospheric Chemistry and Physics**, Reviewer
2001-present **Geophysical Research Letters**, Reviewer
1999-present **Atmospheric Environment**, Reviewer
1999-present **Journal of Atmospheric Chemistry**, Reviewer
1999-present **National Science Foundation, Division of Atmospheric Sciences**, Reviewer
1998-present **Journal of Geophysical Research - Atmospheres**, Reviewer
1998-present **NASA Office of Earth Science, Atmospheric Chemistry Modeling and Analysis Program**, Reviewer
1996-present **American Geophysical Union**, Member

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PUBLICATIONS

Fiore, A.M., L.W. Horowitz, D.W. Purves, H. Levy II, M.J. Evans, Y. Wang, Q. Li, and R.M. Yantosca, Evaluating the contribution of changes in isoprene emissions to surface ozone trends over the eastern United States, *J. Geophys. Res.*, submitted October 2004.

Liu, J., D.L. Mauzerall, L.W. Horowitz, Analysis of seasonal and inter-annual variability in trans-Pacific transport, *J. Geophys. Res.*, submitted July 2004.

Mauzerall, D.L., L.W. Horowitz, and N. Kim, Factors regulating the seasonal cycle of inter-continental air pollution transport of CO between Asia, the United States, and Europe, to be submitted to *J. Geophys. Res.*, 2004.

Geophysical Fluid Dynamics Laboratory (GFDL) Global Atmospheric Model Development Team (GAMDT), The Geophysical Fluid Dynamics Laboratory (GFDL) new global atmosphere and land model AM2/LM2: Evaluation with prescribed SST simulations, *J. Climate*, in press, 2004.

Cooper, O.R., C. Forster, D.D. Parrish, E. Dunlea, G. Hübler, F.C. Fehsenfeld, J.S. Holloway, S.J. Oltmans, B.J. Johnson, A. Wimmers and L. Horowitz, On the life-cycle of a stratospheric intrusion and its dispersion into polluted warm conveyor belts, *J. Geophys. Res.*, *109*, D23S09, doi:10.1029/2003JD004006, 2004.

Goldstein, A.H., D.B. Millet, M. McKay, L. Jaegle, L. Horowitz, O. Cooper, R. Hudman, D.J. Jacob, S. Oltmans, and A. Clarke, Impact of Asian emissions on observations at Trinidad Head, California, during ITCT 2K2, *J. Geophys. Res.*, *109*, D32S17, doi:10.1029/2003JD004406R, 2004.

Fan, S.-M., L.W. Horowitz, H. Levy II, and W.J. Moxim, Impact of air pollution on wet deposition of mineral dust aerosols, *Geophys. Res. Lett.*, *31*, L02104, doi:10.1029/2003GL018501, 2004.

Tang, Y., G.R. Carmichael, L.W. Horowitz, I. Uno, J.-H. Woo, D.G. Streets, D. Dabdub, G. Kurata, A. Sandu, J. Allan, E. Atlas, F. Flocke, L.G. Huey, R.O. Jakoubek, D.B. Millet, P.K. Quinn, J.M. Roberts, D.R. Worsnop, A. Goldstein, S. Donnelly, S. Schauffler, V. Stroud, K. Johnson, M.A. Avery, H.B. Singh, E.C. Apel, Multiscale simulations of tropospheric chemistry in the eastern Pacific and on the U.S. West Coast during spring 2002, *J. Geophys. Res.*, *109*, D23S11, doi:10.1029/2004JD004513, 2004.

Horowitz, L.W., S. Walters, D.L. Mauzerall, L.K. Emmons, P.J. Rasch, C. Granier, X.X. Tie, J.-F. Lamarque, M.G. Schultz, G.S. Tyndall, J.J. Orlando, and G.P. Brasseur, A global simulation of tropospheric ozone and related tracers: Description and evaluation of MOZART, version 2, *J. Geophys. Res.*, *108*(D24), 4784, doi:10.1029/2002JD002853, 2003.

Emmons, L.K., P. Hess, A. Klonecki, X. Tie, L. Horowitz, J.-F. Lamarque, D. Kinnison, G. Brasseur, E. Atlas, E. Browell, C. Cantrell, F. Eisele, R.L. Mauldin, J. Merrill, B. Ridley, and R. Shetter, Budget of tropospheric ozone during TOPSE from two chemical transport models, *J. Geophys. Res.*, *108*(D8), 8372, doi:10.1029/2002JD002665, 2003.

Gauss, M., G. Myhre, G. Pitari, M.J. Prather, I.S.A. Isaksen, T.K. Berntsen, G.P. Brasseur, F.J. Dentener, R.G. Derwent, D.A. Hauglustaine, L.W. Horowitz, D.J. Jacob, M. Johnson, K.S. Law, L.J. Mickley, J.-F. Müller, P.-H. Plantevin, J.A. Pyle, H.L. Rogers, D.S. Stevenson, J.K. Sundet, M. van Weele, and O. Wild, Radiative forcing in the 21st century due to ozone changes in the troposphere and the lower stratosphere, *J. Geophys. Res.*, *108*(D9), 4292, doi:10.1029/2002JD002624, 2003.

Prather, M., M. Gauss, T. Berntsen, I. Isaksen, J. Sundet, I. Bey, G. Brasseur, F. Dentener, R. Derwent, D. Stevenson, L. Grenfell, D. Hauglustaine, L. Horowitz, D. Jacob, L. Mickley, M. Lawrence, R. von Kuhlmann, J.-F. Muller, G. Pitari, H. Rogers, M. Johnson, J. Pyle, K. Law, M. van Weele, and O. Wild, Fresh air in the 21st Century?, *Geophys. Res. Lett.*, *30*(2), 1100, doi:10.1029/2002GL016285, 2003.

Tie, X., L. Emmons, L. Horowitz, G. Brasseur, B. Ridley, E. Atlas, C. Stround, P. Hess, A. Klonecki, S. Madronich, R. Talbot, and J. Dibb, Effect of sulfate aerosol on tropospheric NO_x and ozone budgets: Model simulations and TOPSE evidence, *J. Geophys. Res.*, *108*(D4), 8364, doi:10.1029/2001JD001508, 2003.

Wei, C.-F., V.R. Kotamarthi, O.J. Ogunsola, L.W. Horowitz, S. Walters, D.J. Wuebbles, M.A. Avery, D.R. Blake, E.V. Browell, and G.W. Sachse, Seasonal variability of ozone mixing ratios and budgets in the tropical Southern Pacific: A GCTM perspective, *J. Geophys. Res.*, *107*, 8235, doi:10.1029/2001JD000772, 2002. [printed *108*(D2), 2003]

Contributing author to: Prather, M. and D. Ehhalt, Atmospheric chemistry and greenhouse gases, in *Climate Change 2001: The Scientific Basis*, J.T. Houghton et al., eds., Cambridge University Press, pp. 239-287, 2001.

Tie, X., G. Brasseur, L. Emmons, L. Horowitz, and D. Kinnison, Effects of aerosols on tropospheric oxidants: A global model study, *J. Geophys. Res.*, *106*, 22,931-22,964, 2001.

Mauzerall,D.L., D. Narita, H. Akimoto, L. Horowitz, S. Walters, D. Hauglustaine, G. Brasseur, Seasonal characteristics of tropospheric ozone production and mixing ratios over East Asia: A global three- dimensional chemical transport model analysis, *J. Geophys. Res.*, *105*, 17,895-17,910, 2000.

Spivakovsky, C.M., J.A. Logan, S.A. Montzka, Y.J. Balkanski, M. Foreman-Fowler, D.B.A. Jones, L.W. Horowitz, A.C. Fusco, C.A.M. Brenrefninkmeijer, M.J. Prather, S.C. Wofsy, and M.B. McElroy, Three-dimensional climatological distribution of tropospheric OH: Update and evaluation, *J. Geophys. Res.*, *105*, 8931-8980, 2000.

Horowitz, L.W., and D.J. Jacob, Global impact of fossil fuel combustion on atmospheric NO_x, *J. Geophys. Res.*, *104*, 23,823-23,840, 1999.

Horowitz, L.W., J. Liang, G.M. Gardner, and D.J. Jacob, Export of reactive nitrogen from North America during summertime: Sensitivity to hydrocarbon chemistry, *J. Geophys. Res.*, *103*, 13,451-13,476, 1998.

Liang, J., L.W. Horowitz, D.J. Jacob, Y. Wang, A.M. Fiore, J.A. Logan, G.M. Gardner, and J.W. Munger, Seasonal budgets of reactive nitrogen species and ozone over the United States, and export fluxes to the global atmosphere, *J. Geophys. Res.*, *103*, 13,435-13,450, 1998.

Olson, J., M. Prather, T. Berntsen, G. Carmichael, R. Chatfield, P. Connell, R. Derwent, L.Horowitz, S. Jin, M. Kanakidou, P. Kasibhatla, R. Kotamarthi, M. Kuhn, K. Law, J. Penner, L. Perliski, S. Sillman, F. Stordal, A. Thompson, and O. Wild, Results from the Intergovernmental Panel on Climatic Change photochemical model intercomparison (PhotoComp), *J. Geophys. Res.*, *102*, 5979-5991, 1997.

Staffelbach, T., A. Neftel, and L.W. Horowitz, Photochemical oxidant formation over southern Switzerland, 2, Model results, *J. Geophys. Res.*, *102*, 23,363-23,373, 1997.

Hirsch, A.I., J.W. Munger, D.J. Jacob, L.W. Horowitz, and A.H. Goldstein, Seasonal variation of the ozone production efficiency per unit NO_x at Harvard Forest, Massachusetts, *J. Geophys. Res.*, *101*, 12,659-12,666, 1996.

Jacob, D.J., L.W. Horowitz, J.W. Munger, B.G. Heikes, R.R. Dickerson, R.S. Artz, and W.C. Keene, Seasonal transition from NO_x- to hydrocarbon-limited conditions for ozone production over the eastern United States in September, *J. Geophys. Res.*, *100*, 9315-9324, 1995.

Munger, J.W., D.J. Jacob, B.C. Daube, L.W. Horowitz, W.C. Keene, and B.G. Heikes, Formaldehyde, glyoxal, and methylglyoxal in air and cloudwater at a rural mountain site in central Virginia, *J. Geophys. Res.*, *100*, 9325-9333, 1995.

PRESENTATIONS

Tropospheric ozone and aerosols, GFDL/Hadley Centre Meeting, Princeton, NJ, November 2003.
Tropospheric chemistry and aerosol modeling in AM2, NCAR-GFDL Model Development Meeting, Princeton, NJ, October 2003.
MOZART-2 modeling in ITCT 2K2 and 2K4, Planning Meeting for Summer 2004 Atmospheric Research Campaigns, Durham, NH, April 2003.
Trans-Pacific transport of pollution during ITCT 2K2, ITCT 2K2 Data Workshop, Boulder, CO, March 2003.
Chemical weather forecasts using the MOZART-2 global model in ITCT 2K2, AGU Fall Meeting, San Francisco, CA, December 2002.
Ozone and aerosol modeling: Radiative forcing and air quality, GFDL-NOAA Meeting, Princeton, NJ, November 2002.
Ozone and aerosol modeling: Radiative forcing and air quality, NOAA/OAR Senior Research Council Meeting, Princeton, NJ, November 2002.
Ozone and aerosol modeling: Radiative forcing and air quality, NCAR/GFDL Joint Atmospheric Model Development Workshop, November 2002.
Chemical transport models and applications, NOAA/OAR Aerosol-Tropospheric Ozone Research Workshop, Boulder, CO, October 2002.
Budget of tropospheric ozone in MOZART-2, Max Planck Institute for Meteorology, Hamburg, Germany, June 2002.
Overview of MOZART-2, ITCT 2K2 Planning Meeting, Boulder, CO, November 2001.
Status of MOZART-2, MOZART Workshop, Boulder, CO, November 2001.
Global simulation of tropospheric ozone and related tracers: Description and evaluation of MOZART, version 2, AGU Spring Meeting, Boston, MA, May 2001.
A global simulation of tropospheric ozone and related tracers: Description and evaluation of MOZART, version 2, MOZART Workshop, NCAR, Boulder, CO, April 2001.
MOZART-2: Recent updates and comparison with observations, MOZART Workshop, UIUC, Urbana-Champaign, IL, September 2000.
MOZART-2: Model evaluation and recent updates, MOZART Workshop, Nederland, CO, May 2000.
MOZART-2: Model description and evaluation, MOZART Workshop, Max Planck Institute for Meteorology, Hamburg, Germany, January 2000.
Update on model development at NCAR and status of IPCC effort, NCAR/LLNL Model Symposium, NCAR, Boulder, CO, October 1999.
Global simulation of tropospheric ozone using MOZART-2, NCAR/ASP Research Report, Boulder, CO, October 1999.
Current status of MOZART-2, MOZART Workshop, NCAR, Boulder, CO, September 1999.
Tropical tropospheric ozone: The role of biomass burning and lightning, NCAR/ACD Research Report, Boulder, CO, July 1999
Model Simulation of Tropical Tropospheric Ozone, and Its Dependence on Biomass Burning, Lightning, and Convection, AGU Spring Meeting, Boston, MA, June 1999.

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Tropospheric ozone in the tropics: The role of biomass burning and lightning, NCAR/ASP Presentation, Boulder, CO, May 1999.

2-D and 3-D chemical transport modelling: Preliminary results and future plans for the MOZART-2 model, NCAR/ASP Research Report, Boulder, CO, October 1998.

Tropospheric ozone in the tropics: The role of convection, NCAR/ASP Research Report, Boulder, CO, May 1998.

Update on recent work on the MOZART model, NCAR/ACD Presentation, Boulder, CO, March 1998.

The impact of fossil fuel combustion on the global distributions of tropospheric nitrogen oxides and ozone, AGU Fall Meeting, San Francisco, CA, December 1997.

The effect of non-methane hydrocarbons on the export of reactive nitrogen from North America during summertime, AGU Fall Meeting, San Francisco, CA, December 1996.