John Wong

Curriculum Vitae

Address: 216 UCB, Boulder, CO 80309-0216
Email: anotherJohnWong@gmail.com
Other links: LinkedIn, Github

Education

2010 – 2013 **Ph.D., Atmospheric and Oceanic Sciences**
University of Colorado at Boulder
Advisors: Dr. Mary Barth (NCAR/ACD), Dr. David Noone (CU)
Dissertation: Upper Tropospheric Ozone Enhancement during the North American Monsoon Evaluated using WRF-Chem
Defense date: August 23, 2013

2008– 2010 **M.S., Atmospheric and Oceanic Sciences**
University of Colorado at Boulder
Advisor: Dr. David Noone

2006 – 2007 **M.A., Physics**
University of Arkansas, Fayetteville
Advisor: Dr. John Stewart
Masters Thesis: Web-based Application for Automated Generation of Physics Concept Inventory

2003 – 2006 **B.S.** *magna cum laude*, **Physics** (Computational track)
University of Arkansas, Fayetteville
Advisor: Dr. Jiali Li
Thesis: DNA Detection with a Nanopore Device

2003 – 2006 **B.S.** *magna cum laude*, **Mathematics** (Applied track)
University of Arkansas, Fayetteville
Thesis: Chromatic Polynomial of Torus Networks

2003 – 2006 (minor) **Computer Sci and Computer Engineering**
University of Arkansas, Fayetteville

Projects

2012 – 2013 **Nested Regional Climate Model (NRCM)**
Assisting in a project at the National Center for Atmospheric Research (NCAR) to test and develop the regional chemistry module for a next-generation climate model across scales as well as utilizing climatological simulations to evaluate future pollution scenarios.

2010 – 2012 **Lightning parameterization at the convective scale**
As part of my ongoing research work with budgeting upper tropospheric summertime ozone enhancement, I have implemented a lightning parameterization module for WRF-Cem that is suitable for models running at resolutions that are transitional between fully-resolved and fully-parameterized convection.

2010 **Chemical kinetics with OpenCL**
For the class project of High Performance Scientific Computing at the University of Colorado at Boulder, I produced a version of the Regional Acid Deposition Model version 2 with Rosenbrock integration method using OpenCL. The same (identical) kernel has been tested and successfully ran on various CPUs and GPUs on platforms running Mac OS X 10.6.

2008 – 2013 **Convective-scale transport of trace gases assessed with models and satellite observations**
A collaboration between multiple scientists from NCAR, CU-Boulder, NOAA, and NASA JPL to quantify the contribution of North American summer-time convective transport to the distribution of ozone and carbon monoxide in the upper troposphere using both regional atmospheric chemistry models and satellite observations.

2007 – 2008 **Technical assistant** at Univ. of Arkansas
Debugged and optimized existing Matlab programs for analyzing signals from solid state nanopore device.

Publications

Wong, J., M. C. Barth, J. R. Worden, D. C. Noone (2014): Upper tropospheric ozone enhancement during the North American Monsoon in 2006: 1. Model evaluation and tracer analysis. J. Geophys. Res. Submitted.

Wong, J., M. C. Barth, J. R. Worden, D. C. Noone (2014): Upper tropospheric ozone enhancement during the North American Monsoon in 2006: 2. Spatiotemporal structure and sensitivity to lightning-generated NO_x. J. Geophys. Res. Submitted.

Wong, J., M. C. Barth, and D. Noone (2013). Evaluating a lightning parameterization based on cloud-top height for mesoscale numerical model simulations, Geosci. Model Dev., 6, 429-443, doi:10.5194/gmd-6-429-2013.

Pfister, G., S. Walters, J.-F. Lamarque, J. Fast, M. Barth, **J. Wong**, J. Done, G. Holland, C. Bruyere (2013). Projections of Future Summertime Ozone over the U.S. J. Geophys. Res. Submitted.

Noone. D., C. Risi, A. Bailey, M. Berkelhammer, D. P. Brown, N. Buenning, S. Gregory, J. Nusbaume, D. Schneider, J. Sykes, B. Vanderwende, **J. Wong**, Y. Meiller, and D. Wolfe (2013). Determining water sources in the boundary layer from tall tower profiles of water vapor and surface water isotope ratios after a snowstorm in Colorado. Atmos. Chem. Phys., 13, 1607–1623, doi:10.5194/acp-13-1607-2013.

Barth., M.C. , J. Lee, A. Hodzic, G. Pfister, W. C. Skamarock, J. Worden, **J. Wong**, and D. Noone (2012). Thunderstorms and upper tropospheric chemistry during the early stages of the 2006 North American Monsoon. Atmos. Chem. Phys., 12, 11003-11026, doi:10.5194/acp-12-11003-2012.

Selected Oral Presentations

Wong, J., M. Barth, and D. Noone. Lightning NOx parameterization in WRF-Chem with emphasis on validation. Invited talk at WRF-Chem Group Meeting, August 23, 2012; Boulder, CO.

Wong, J. From gaming to scientific computing: An introduction to General Purpose programming with GPUs (GPGPU). Presentation at Department of Atmospheric and Oceanic Science student forum, February 16, 2011; Boulder, CO.

Wong, J., D. Noone, M. C. Barth, W. Skamarock, G. Grell, and J. Worden. Budget and structural properties of the UTLS ozone enhancement during North American monsoon. Invited talk at WRF-Chem Group Meeting, October 27, 2010; Boulder, CO.

Selected Poster Presentations

Bela, M., M. Barth, **J. Wong**, O. Toon, H. Morrison, M. Weisman, K. Manning, G. Romine, W. Wang, K. Cummings, K. Pickering, and the DC3 Science Team. (2013) Evaluation of Wet Scavenging for the May 29, 2012 DC3 Severe Storm Case. 14th Annual WRF Workshop; 2013 Jun 24 – 29; Boulder, CO.

Wong, J., M. Barth, and D. Noone. (2012) Parameterizing Lightning-Generated NOx at resolutions with Convective Parameterization for Upper Tropospheric Ozone Simulations. 12th Annual WRF Users' Workshop; 2012 Jun 26 – 29; Boulder, CO.

Wong, J., M. Barth, and D. Noone. (2011) Lightning NOx Parameterization for Synoptic Meteorological-scale Predictions with Convective Parameterization in WRF-Chem. American Geophysical Union Fall meeting; 2011 Dec 5–9; San Francisco, CA.

Noone, D., C. Risi, A. Bailey, D. Brown, N. Buenning, S. Gregory, J. Nusbaumer, J. Sykes, D. Schneider, B. Vanderwende, **J. Wong**, D. Wolfe. (2010) Atmosphere-surface water exchanges from measurements of isotopic composition at a tall tower in Boulder. American Geophysical Union Fall Meeting; 2010 Dec 13–17; San Francisco, CA.

Wong, J., D. Noone, M. C. Barth, W. Skamarock, G. Grell, and J. Worden. (2009) A budget of the summertime ozone anomaly of 2006 above southern United States using WRF-Chem. American Geophysical Union Fall Meeting; 2009 Dec 14–18; San Francisco, CA.

Wong, J., D. Noone, M. C. Barth, W. Skamarock, G. Grell, and J. Worden. (2008) Coarse-scale convective transport of CO and O_3 over 36 hours above southern United States. American Geophysical Union Fall Meeting; 2008 Dec 15–19; San Francisco, CA.

Sourcecode contributions

Lightning NOx driver
in *WRF-Chem v3.5*
Refactored old implementation of lightning nitrous oxides (NOx) emission module of WRF-Chem into two separate modules, each separately handle flash rate prediction and NOx emission respectively. Also mediate concurrent contribution from scientists from Florida State University.

Lightning-generated NOx for convective parameterized models
in *WRF-Chem v3.4*
Implemented lightning NOx emission option into WRF-Chem for convective parameterized scale simulations based on Price and Rind (J. Geophys. Res., 1992) parameterization and Ott et al (J. Geophys. Res., 2010) emission guidelines.

Online tendency diagnostics
in *WRF-Chem v3.2*
Developed module for decoupling tendency diagnostics for chemical species and producing accumulated diagnostic outputs.

Technical Skills

Techniques: Data analytics, machine learning, heuristic optimization, heterogenous arch.
Languages: C/C++, Java, Python, Objective-C, Fortran, Javascript, PHP, *NIX scripting

Frameworks and libraries: OpenCL, MPI, OpenMP; Prototype, Dojo; exposure to jQuery
IDEs and tools: vi, Xcode, Instruments; Git
Data formats: XML, JSON, NetCDF, HDF5, GTFS
Miscelleneous: IDL, Matlab; LaTeX; MongoDB, SQLs, exposure to Hadoop/Pig, AWS

Upperlevel Courseworks

Computer Science
Artificial Intelligence, Database Management Systems, Formal Languages and Computability, Graph and Combinatorial Algorithms, High Performance Scientific Computing

Mathematics
Genetic Algorithms, Advanced Calculus, Numerical Analysis, Numerical Linear Algebra, Ordinary Differential Equations, Partial Differential Equations (PDE), Independent readings in Nonlinear PDE, Stochastic Processes

Physics
Mathematical Methods in Electromagnetic Theory, Thermal Physics, Quantum Mechanics, Applied Group Theory in Physics, Fluid Instability & Turbulence

Atmospheric Science
Numerical Weather Prediction, Atmos. Chemistry, Atmospheric Dynamics (I & II), Physical Oceanography, Radiative Transfer & Remote Sensing, Clouds & Aerosols

Conference/Workshop Attendance

3 – 7 Dec, 2012	Amer. Geophys. Union Fall Meeting, San Francisco, CA
26 – 29 Jun, 2012	12th Annual WRF Users' Workshop, Boulder, CO
5 – 9 Dec, 2011	Amer. Geophys. Union Fall Meeting, San Francisco, CA
21 – 25 Jun, 2010	11th Annual WRF Users' Workshop, Boulder, CO
16 – 17 Jun, 2010	TES Science Team Meeting, Pasadena, CA
14 – 18 Dec, 2009	Amer. Geophys. Union Fall Meeting, San Francisco, CA
19 – 22 Oct, 2009	Extra-Tropical UTLS Community Workshop, Boulder, CO
23 – 26 Jun, 2009	10th Annual WRF Users' Workshop, Boulder, CO
23 – 25 Feb, 2009	TES Science Team Meeting, Boulder, CO
15 – 19 Dec, 2008	Amer. Geophys. Union Fall Meeting, San Francisco, CA
23 – 27 Jun, 2008	9th Annual WRF Users' Workshop, Boulder, CO
2005 – 07	Apple's WWDC 2005–2007, San Francisco, CA

Honors, Awards & Scholarships

2012	Department of Atmospheric and Oceanic Sciences Best Poster Award
2011	United Government for Graduate Student Travel Grant
2005 – 2007	Apple's Worldwide Developer Conference Student Scholarship
2005 – 2006	Foundation of International Exchange Students Scholarship
2005 – 2006	Droke-Dunn Award for Outstanding Senior Math Major
2005 – 2006	Robert D. Maurer Research Scholarship for Physics Major
2004 – 2006	David P Richardson Math Departmental Scholarship
2004 – 2006	College of Engineering Scholarship
2004 – 2005	Univ. of Arkansas Chartwell's Room and Board Scholarship
2004 – 2005	Physics Departmental Scholarship
2004	First Place in 2004 ACM Collegiate Programming Contest
2003 – 2005	Engineering Dean's List

Teaching Experience

01 – 05/2013	**Teaching Assistant** for ATOC 1050 Weather and Atmos. University of Colorado at Boulder
2008 – 2013	**Lab Instructor** for ATOC 1070 Weather and Atmos. Lab University of Colorado at Boulder
2004 – 2006	**Supplemental Instructions Leader** for Math and Physics Enhanced Learning Center, University of Arkansas