

# John Wong

## Curriculum Vitae

**Email:** anotherJohnWong@gmail.com  
**Other links:** LinkedIn, Github

### EXPERIENCE

2016 – present

#### **Sr Scientific Software Engineer**

at The Weather Company, an IBM Business

As part of the Computation Meteorological Analysis and Prediction (CMAP) team, create, evaluate, refine, and reduce to practice cutting-edge meteorological technologies that drive weather content that reaches billions of people worldwide. Using modern software engineering practices and working closely with the scientific staff, architect and implement methods to advance the operational forecasting systems.

2014 – 2016

#### **Aviation iOS Software Engineer**

at The Weather Company, an IBM Business

Develop, maintain, architect WSI Pilotbrief Optima for the iPad, the most deployed aviation weather app in commercial aviation. Substantially improved users satisfaction by stabilizing and re-architected legacy codebase. Interfaced directly with beta testers and handled logistics related to pre-release programs.

2013 – 2014

#### **Founder and developer** at Metfolio, LLC

Metfolio is a start-up endeavor I bootstrapped on October 24, 2013, founded on the idea of discovering unexplored values in professional and research weather products by consumers. An aviation weather app, Nimbus, was briefly released in March, 2014 as the initial testing ground.

2009 – 2013

#### **Graduate research/teaching assistant** at Univ. of Colorado

Perform research under the primary guidance of Dr. Mary Barth at the National Center of Atmospheric Research (NCAR) and perform teaching duties when needed for the Department of Atmospheric and Oceanic Science.

2007 – 2008

#### **Technical assistant** at Univ. of Arkansas

Debugged and optimized existing Matlab programs for analyzing signals from solid state nanopore device.

## 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

- 2014 – present      **WSI Pilotbrief Optima for the iPad**  
The leading aviation weather app deployed by commercial aviation. Delivers superior weather information, compiled text briefing, navigation information and flight plan overlay, inflight weather data streaming, and much more.
- 2013 – 2014      **Nimbus — An Aviation weather app**  
Nimbus is an aviation weather app designed for the iPhone. It was released in March 2013 on the iTunes App Store and features a novel time-varying map-based graphical TAF interface. It was removed from the App Store at the beginning of the my career at WSI.

- 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-Chem 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.

## SOURCECODE CONTRIBUTIONS

### **Lightning NO<sub>x</sub> driver**

in *WRF-Chem v3.5*

Refactored old implementation of lightning nitrous oxides (NO<sub>x</sub>) emission module of WRF-Chem into two separate modules, each separately handle flash rate prediction and NO<sub>x</sub> emission respectively. Also mediate concurrent contribution from scientists from Florida State University.

### **Lightning-generated NO<sub>x</sub> for convective parameterized models**

in *WRF-Chem v3.4*

Implemented lightning NO<sub>x</sub> 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:** Machine learning, heuristic optimization, heterogenous architecture

**Languages:** Python, Objective-C, Swift, C/C++, Java, Fortran, Javascript, \*NIX scripting

**Frameworks and libraries:** OpenCL, MPI, OpenMP, SciPy, Scikit-learn

**IDEs and tools:** vi(m), Xcode, Instruments, Eclipse; Git; IDL, Matlab, Octave

**Data and DBs:** NetCDF, HDF5, GTFS; SQLs, exposure to MongoDB, Cassandra

**Miscellaneous:** L<sup>A</sup>T<sub>E</sub>X; exposure to Hadoop/YARN, AWS; Aviation (student pilot)

## PUBLICATIONS

Pfister, G., S. Walters, J.-F. Lamarque, J. Fast, M. Barth, **J. Wong**, J. Done, G. Holland, C. Bruyere (2014). Projections of Future Summertime Ozone over the U.S. *J. Geophys. Res.* doi:10.1002/2013JD020932.

**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.

Noone, D., C. Risi, A. Bailey, M. Berkelhammer, D. P. Brown, N. Buening, 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 NO<sub>x</sub> 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 NO<sub>x</sub> 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 NO<sub>x</sub> 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<sub>3</sub> over 36 hours above southern United States. American Geophysical Union Fall Meeting; 2008 Dec 15–19; San Francisco, CA.

## UPPERLEVEL COURSEWORKS

**Computer Science** High Performance Scientific Computing, Artificial Intelligence, Database Management Systems, Discrete Optimization, Formal Languages and Computability, Graph and Combinatorial Algorithms **Mathematics** Genetic Algorithms, Numerical Linear Algebra, Nonlinear Partial Differential Equations, Stochastic Processes, Game Theory **Physics** Fluid Instability & Turbulence, Mathematical Methods in Electromagnetic Theory, Thermal Physics, Quantum Mechanics, Applied Group Theory in Physics **Atmospheric Science** Numerical Weather Prediction, Atmospheric Chemistry, Atmospheric Dynamics, Physical Oceanography, Radiative Transfer & Remote Sensing, Clouds & Aerosols