Curriculum Vitae- 2019

Jason Kwock Sung Ching
University of North Carolina, Institute for the Environment
Telephone: 919 630 0325
Email: jksching@gmail.com

EDUCATION

Ph.D.	Atmospheric Science, University of Washington**,** Seattle, WA, 1974
M.S.	Meteorology, Penn State University, University Park, PA, 1964
B.S.	Meteorology, University of Hawaii, Honolulu, HI, 1962

PROFESSIONAL EXPERIENCE

2011-2013	Faculty Fellowship Program at UCAR (Urban database, Fine grid scale modeling)
2011 to present	Senior Research Fellow at University of North Carolina at Chapel Hill
2008- 2010	Physical Scientist, EPA (NERL/AMD), RTP, NC (Retired 12/2010)
1975- 2008	Meteorologist, NOAA/ARL/ASMD (on assignment to EPA (NERL/AMD), RTP, NC
1990-1998	Chief, Atmospheric Model Development Branch, NOAA/ARL/ASMD (NERL/AMD), RTP, NC
1970-1975	Meteorologist, NOAA/ARL assigned to BOMAPIFYGL-GATE Project Offices, Washington DC
1964-1966	Meteorologist, Woods Hole Oceanographic Institute, Woods Hole, Massachusetts

NARRATIVE:

Jason Ching has been involved with meteorological and air quality research field studies and modeling at NOAA and the USEPA for 40 years until my retirement from Federal service at the end of 2010. In the first 5 years, with NOAA, He was involved either in planning and/or analysis of outcomes from major field studies such as the Barbados Oceanic and Meteorology Experiments (BOMEX), the International Field Year of the Great Lakes (IFYGL) and the GARP Global Atlantic Tropical Experiment (GATE). In the succeeding years at EPA, he led field studies including urban boundary layer sub-project of the Regional Air Pollution Study (RAPS, planned and led the (a) 1978 Tennessee Plume Study (TPS), (b) 1979 and 2000 Northeast Regional Oxidant Studies (NEROS), and the 1987-1989 Eulerian Model Evaluation Field Study (EMEFS) for the Regional Acid Deposition Model (RADM) model. His research began to encompass air quality model development programs beginning in the early 1980s. These efforts included development, evaluation and investigation of advanced air quality modeling tools including the EPA's Regional Oxidant Model (ROM), the Regional Acid Deposition Model (RADM) (and its meteorological driver MM5), and the Regional Particulate Model (RPM). In 1990, he initiated and was responsible for the conceptual design and first implementation of the CMAQ portion of the Models-3/ Community Multiscale Air Quality Modeling (CMAQ) system. The CMAQ is now widely accepted by the international air quality modeling community; and is being utilized in a wide variety of applications, including being a decision support system for air quality issues at local, state federal and internationally. After its successful initial implementation and delivery in 1998, he has been engaged in investigations to promote, develop and apply CMAQ and meteorological models (MM5 and WRF) at urban to neighborhood scales to address advanced fine scale and urban meteorological modeling challenges and air quality modeling applications. To support this, he has been engaged in activities and efforts to develop and implement advanced urban parameterizations and supporting input data into current meteorological models. This included initiating and leading the development of the prototype National Urban Database and Access Portal Tools, NUDAPT. Like CMAQ, the NUDAPT is designed as an open community-based system to facilitate the implementation of advanced urban parameterizations into meteorological, dispersion and air quality modeling system. Installation of this database has been completed at NCAR for implementing urbanized WRF (and CMAQ) model applications and is available for the 2013 WRF release.

Currently, as a Senior Research Collaborator at UNC's Institute for the Environment (UNC-IE), he continues to be engaged and perform research with focus on fine grid and urban scale modeling. He was the co-initiator and currently engaged in an innovative collaboration with members of the IAUC (and others) towards the goal of extending NUDAPT concept to worldwide coverage. This community-based, rapidly evolving and growing project and highly collaborative project is called World Urban Database and Access Portal Tools (WUDAPT). He was further collaborating with NCAR and CIEMAT in an investigation regarding a fundamental issue of mesoscale meteorological modeling that seeks to use fine grid mesh sizes comparable to the size of turbulent motions in the PBL. In this so-called "terra incognita" regime, model uncertainties introduced when PBL subgrid turbulence schemes are applied are being examined.

PROFESSIONAL ACTIVITIES

- Guest Editor: Special WUDAPT Issue for Urban Climate
- Convenor, WUDAPT 2018 Workshops: Chengdu & Hong Kong (with Passive Low Energy Architecture)
- Contributor to WMO's Guide for Integrated Urban Weather, Environment and Climate Services
- Contributor to WMO's Chemical Weather AQ Forecasting Report
- Principal Investigator: World Urban Database and Access Portal Tools (WUDAPT) (2002-present)
- Collaborative investigation with UCAR's Mesoscale Modeling Division: PI on Mesoscale modeling issues in the Terra Incognita regime.
- Principal Investigator: National Urban Database and Access Portal Tools (2006-)
- Principal Investigator: Grid and Sub-grid air quality modeling for Exposure assessments (2005-)
- Collaboration with Baylor College of Medicine" Linkage of hospital admissions and air quality in Houston)
- Development of advance urbanized canopy parameterizations in MM5 (since 2001)
- Principal Investigator: USEPA Neighborhood-Scale Air Quality modeling Project (since 1999)
- UNC Carolina Environmental Programs (CMAS Conferences)
- Western Regional Air Partnership (WRAP) on Visibility issues in the Western US (since 1998)
- Research and Development Forum
- Air Quality Modeling Forum
- Principal Investigator: USEPA Models-3/Community Air Quality (CMAQ) Modeling system (1990-1999)
- Principal Investigator: Regional and Urban Scale PM Modeling for RADM, Models-3/CMAQ 1988-2000
- Principal Investigator in EPA Field Programs or Components:
- RAPS (Regional Air Pollution Study (St Louis)) Urban boundary layer Component 1975-1982)
- TPS (Tennessee Plume Study) (1978-1980)
- NEROS (NorthEast Regional Oxidant Study) (1979-1982)
- PEPE (Persistent Elevated Pollutioin Episode (1980-1982)
- CUVENT (CUmulus VENTing study) (~1985)
- Acid-MODES/Eulerian Model Evaluation Field Study (EMEFS) (w/Environment Canada and EPRI) (1997-1990
- Interagency Workgroup on Air Quality Modeling (IWAQM) (~1985-1990)
- Great Waters Study of CAAA-90 (Toxics and Nitrogen deposition studies) (1990-1992)
- Ozone Research Strategy: Section 185B; Clean Air Act Amendment - 1990
- Chairman: Modeling and Chemistry Workgroup
- Collaborations: with NASA
- Study of cumulus cloud transport of ozone using NASA UV-DIAL airborne system- 1983
- EPA-NASA Advanced Monitoring Initiative on Tropospheric Ozone
- American Meteorological Society:
- Chairman: Meteorological Aspects of Air Pollution Committee
- Chairman: Seventh Conference on Applications of Air Pollution Meteorology
- Board of urban Environment
- Steering Committee: Specialty Conference on Urban Boundary Layers

- Steering Committee: Urban Environment
- Air and Waste Management Association:
- Chairman: Modeling Session: Specialty Conference Regional Photochemistry, San Diego, CA (11/93)
- Chairman: Modeling Session: Conference Regional Particulate Matter-Health and Regulatory Issues, Pittsburgh, PA (4/95)
- Atmospheric Sciences &Applications to Air Quality (ASAAQ):
- International Program Committee for ASAAQ 2000 in Taiwan;
- Workshop Convenor: Air Quality Modeling Challenges (Asia) at ASAAQ-2000
- US-Canada Bi-lateral Agreement on Acid Deposition Modeling:
- Chairman: Program Management Group
- Chairman: Diagnostic Measurements Team
- WMO/UNDP Consultant to Peoples Republic of China, 1985
- National Acid Precipitation Assessment Program (NAPAP): RADM development, evaluation
- Adjunct Faculty: MEAS/North Carolina State University, 1976-1990
- Society of Sigma Xi
- American Association for the Advancement of Science
- American Men and Women of Science
- International Association of Urban Climate

HONORS/AWARDS

- EPA Bronze Medal, Project Leader: For outstanding team research achievement in the development and evaluation of the Models-3 Computational Framework and the Community Multi-Scale Air Quality Modeling System, 1999.
- EPA Bronze Medal, Advanced modeling system for characterizing and assessing air pollutant impacts on Federally protected pristine areas (Class 1 areas), 1996.
- EPA Bronze Medal, Development, evaluation and application of Regional Acid Deposition Model (RADM), 1990.
- NAPAP Certificate, Outstanding contribution to NAPAP, 1989.

PROFESSIONAL AFFILIATIONS

- American Meteorological Society
- Air and Waste Management Association
- International Association of Urban Climatology
- American Association of Geographers
- Atmospheric Science and Applications to Air Quality

PROFESSIONAL COLLABORATIONS

- **Organizations**: University Corporation for Atmospheric Research, National Center for Atmospheric Research; American Meteorological Society; **University(s):** Arizona State, Baylor College, Chicago, Houston, North Carolina, North Carolina State, Notre Dame, North Dakota, Penn State, Rutgers, San Jose State, Utah, University College of Dublin **Federal:** Army Research Office, NASA Langley Research Center, US National Park Service, National Laboratories at Argonne, Brookhaven, Los Alamos, Pacific National Lab, Scandia, TVA; **State and Industry:** Electric Power Research Institute, Delaware Natural Resources and Environmental Control, New York State, RTI; **International**: Atmospheric Environment, Canada, CIEMAT, Danish Met Institute, Ontario Ministry of Environment and Energy, European Union: MEGAPOLI, COST, Fraunhofer Institute, World Health Organization; Invited lecturer; **Croucher Advanced Study Institute 2011-2012**Urban Climatology for Tropical & Sub-tropical Regions, NCAR

(fine grid mesh WRF modeling in the Terra Incognita regime). Invited Lecturer @ NUI-Maynooth and UCD, Ireland, IIASA, Austria, Sun Yet Sen University, Guanzhou, China, University of Cyprus.

- WUDAPT Collaborations:
- University College of Dublin, IIASA, U of Hamburg, Chinese U of Hong Kong, Hong Kong U of Science and Technology, Hong Kong U, UCAR, U of Victoria, CA, ANL, U of Toronto, Meteo-France, Sun Yet Sen U, U of Sao Paulo, U of Cyprus, Purdue U, WMO, GEO, Future Earth, Google Outreach, UC-Berkeley, U of Toulouse, IAUC, AMS, PLEA, U of Chengdu, ASU, ENVIMET, Inst Urban Meteorology, Jianan U,

- **Reviewer:** J. Applied Meteorology and Climate, J. of Atmospheric Sciences, AMS Bulletin; J. Geophysical Research, Atmospheric Environment, Water, Air, and Soil Pollution, J. Air Pollution Control Association, J. Air and Waste Management Association, Boundary Layer Meteorology, Urban Climate, Remote Sensing

PUBLICATIONS: JOURNAL ARTICLES

Ching.J., G. Mills, B. Bechtel, L See, J. Feddema, X. Wang, C. Ren, O. Brousse, A. Martilli, M. Neophytou, I. Stewart, A. Hanna, E. Ng, M. Foley, P. Alexander, J. Hidalgo, V. Masson, D. Aliaga, D. Niyogi, M. Andrade, A. Sreevestava, A. Baklanov, J. Fung, P. Mouzourides, P. Bhalachandran, J. Dai, W. Dai, K. Hammerberg, G. Milcinski, M. Demuzere, N. Brunsell, M Pesaresi, S. Miao, F. Chen, 2018, World Urban Database and Access Portal Tools (WUDAPT), an urban weather, climate and environmental modeling infrastructure for the Anthropocene, Bulletin of AMS.

Mouzourides, P., A. Kyprianou, R. Choudhary, **J. Ching,** M. Neophytou, 2017: Multi-scale analysis of urban-scale building-energy demands for smart energy management, Energy, Submitted and revised

B. Bechtel, M. Pesaresi, L. See, G. Mills, **J. Ching,** P.J. Alexander, J.J. Feddema, A.J. Florczyk, I. Stewart, 2016, Towards consistent mapping of urban structures – global human settlement layer and local climate zones, *Second International Conference on Image and Signal Processing (ISPR -2016) December 30~31, 2016, Vienna, Austria*

Ching J., L. See C. Ren, V. Masson, J. Hildalgo, X.Wang, G. Mills and J.Feddema, 2017: The WUDAPT framework to generating urban morphology, material composition and activity data for modeling, 13th Urban Environment, 97th AMS Annual Meeting, Jan 22-26, 2017, Seattle WA

Ching, J., 2017, Environmental modeling using WUDAPT for addressing climate change issues impacting urban areas, *Passive Low Energy Architecture Conference, Edinburgh, Scotland, July 2017*

Julia Hidalgo, Valéry Masson, Marion Bonhomme, Nathalie Tornay, Serge Faraut, **Jason Ching,** Gerald Mills, Edward Ng, Chao Ren, Johannes Feddema, 2017, Architectural Archetypes Database Propositions for WUDAPT, *Passive Low Energy Architecture Conference, Edinburgh, Scotland, July 2017.*

Mills, G., B. Bechtel, M. Foley, **J. Ching,** L. See, J. Feddema, 2017: 9.1:The WUDAPT Project: Status of Database and Portal Tools. 13th Urban Environment, *97th AMS Annual Meeting, Jan 22-26, 2017, Seattle WA.*

Mills, G., **Ching, J**, 2017, Using WUDAPT to explore urban exposure to climate risks in selected cities. *Passive Low Energy Architecture Conference, Edinburgh, Scotland, July 2017.*

Oscar Brousse, Alberto Martilli, Mícheál Foley, Gerald Mills, Benjamin Bechtel, Kris Hammerberg, Chao Ren, Paul J. Alexander, Dev Niyogi, Matthias Demuzerre, Linda See, **Jason Ching,** 2017, On the added value of WUDAPT for Urban Climate Modelling, *European Geosciences Union General Assembly, Vienna Austria, 23-28 April , 2017*

Bechtel B, Pesaresi M, See L, Mills G, **Ching J**, Alexander PJ, Feddema JJ, Florczyk AJ, Stewart I, 2016: Towards consistent mapping of urban structures - Global human settlement layer and local climate zones International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences - ISPRS Archives41:1371-1378.

Ching, J., G. Mills, L. See, B. Bechtel, J. Feddema, I. Stewart, A. Hanna, X. Wang, E. Ng, R. Chao, O. Brousse, A. Martilli, M. Neophytou, G. Milcinski, M. Foley, P. Alexander, J. Hidalgo, V. Masson, 2016: WUDAPT (World Urban Database and Access Portal Tools): an international collaborative project for climate relevant physical geography data for the world's cities, Extended Abstracts, 96th AMS Annual Meeting, New Orleans, LA

Ching J, G. Mills, L. See, B. Bechtel, J. Feddema, I. Stewart, A. Hanna, 2014: WUDAPT (World Urban Database and Access Portal Tools) an International Collaborative Project for Climate Relevant Physical Geography Data for the World's Cities, 94th AMS Annual Meeting, New Orleans, LA

Bechtel, B., Alexander, P., Böhner, J., **Ching, J.,** Conrad, O., Feddema, J., Mills, G., See, L. and Stewart, I. 2015. Mapping local climate zones for a worldwide database of form and function of cities. *International Journal of Geographic Information*, 4(1), 199-219. doi:10.3390/ijgi4010199.

Mills, G., **Ching, J**., See, L., Bechtel, B., Feddema, J., Masson, V., Stewart, I., Neophytou, M., O'Connor, M., Chen, F., Martilli, A., Grimmond, S., Alexander, P., Foley, M., Gal, T., Wang, X., Mitra, C., Pereira, N., Steeneveld, G.-J. Introduction to the WUDAPT Project, Proceedings, *9th International Conference on Urban Climate (jointly with 12th Symposium on the Urban Environment)*, Toulouse, France, July, 2015.

Bechtel, B., Foley, M., Mills, G., **Ching, J**., See, L., Alexander, P., O'Connor, M., Albuquerque, T., de Fatima Andrade, M., Brovelli, M., Das, D., Fonte, C., Petit, G., Hanif, U., Jimenez, J., Lackner, S., Liu, W., Pereira, N., Rosni, N.A., Theeuwes, N., Gal, T. CENSUS of Cities: LCZ Classification of Cities (Level 0): Workflow and Initial Results from Various Cities, Proceedings, *9th International Conference on Urban Climate (jointly with 12th Symposium on the Urban Environment)*, Toulouse, France, July, 2015.

See, L., Mills, G., & **Ching, J**. (2015). Climate modelling: Community initiative tackles urban heat. *Nature*, 311 526(7571), 43-43. http://doi.org/10.1038/526043b

See, L., **Ching, J**., Masson, V., Feddema, J., Mills, G., Neophytou, M., Foley, M., O'Connor, M., Perger, C., Duerauer, M., Fritz, S., Bechtel, B. Generating WUDAPT's Specific Scale-dependent Urban Modeling and Activity Parameters: Collection of Level 1 and Level 2 Data, Proceedings, *9th International Conference on Urban Climate (jointly with 12th Symposium on the Urban Environment)*, Toulouse, France, July, 2015.

Feddema, J., Mills, G. and **Ching, J**. Demonstrating the Added Value of WUDAPT for Urban Climate Modelling, Proceedings, *9th International Conference on Urban Climate (jointly with 12th Symposium on the Urban Environment)*, Toulouse, France, July, 2015.

Ching, J., Mills, G., See, L., Bechtel, B., Feddema, J., Hanna, A., Milcinski, G., Masson, V., Neophytou, M., Mitra, C., O'Connor, M., Pereira, N., Steeneveld, G.-J., Stewart, I., Wang, X., Alexander, P., Foley, M., Gál, T. The Portal Component, Strategic Perspectives and Review of Tactical plans for Full Implementation of WUDAPT, Proceedings, *9th International Conference on Urban Climate (jointly with 12th Symposium on the Urban Environment)*, Toulouse, France, July, 2015.

M. Neophytou, P. Mouzourides, A, Kyprianou, R. Choudhary and **J. Ching**, 2015: Sensitivity of mesoscale models to scale dependent UCP inputs, an example from energy demand, *9th International conference on Urban Climate (jointly with 12th Symposium on the Urban Environment)*, Toulouse, France, July, 2015.

See, L., **J. Ching**, and 11 others, 2015: Developing a community-based worldwide urban morphology and materials database (WUDAPT) using remote sensing and crowdsourcing for improved urban climate/UHI modeling, 978-1-4799-6652-3/15, IEEE.

Ching, J. 2014: Integrated Urban Modeling Symposium Plenary Presentation, "WUDAPT, a worldwide urban database for climate and environmental modeling, innovation concepts to reality", Lyon, France, Oct 15-19, 2014.

Ching, J., R. Rotunno, M. Lemone, A. Martilli, B. Kosovic, P.A. Jimenez, and J. Dudhia, 2014: Mesoscale meteorological modeling at kilometer scale grid meshes for air quality simulations, Proceedings, 94th American Meteorological Society Annual Meeting, Atlanta GA.

Ching, J., R. Rotunno, M. Lemone, A. Martilli, B. Kosovic, P.A. Jimenez, and J. Dudhia, 2014: Convectively induced secondary circulations in find-grid mesoscale numerical weather prediction models, Monthly Weather Review (142) 3284-3302.

Ching J, G. Mills, L. See, P. Alexander, B. Bechtel, J. Feddema, K. Oleson, I. Stewart, M Neophytou, F. Chen, W. Wang, A. Hanna, 2014: WUDAPT: Facilitating advanced urban canopy modeling for weather, climate and air quality applications, Extended Abstract, 94th AMS Annual Meeting, Atlanta, GA.

Ching, J., 2013: A perspective on urban canopy layer modeling for weather, climate and air quality applications, Urban Climate, 3: 13-39.

Ching, J., 2012: WUDAPT: Conceptual framework for an international community urban morphology database to support meso-urban and climate models. Feature Article, IAUC Urban Climate News: Issue 45, p 6-17.

Ching, J. and F. Chen 2012: Modeling the Urban Boundary and Canopy Layers, Book Chapter in Taylor and Francis "Handbook of Environmental Fluid Dynamics" edited by Joe Fernando**Ching, J.,** and M Majeed, 2011, An approach to characterize within-grid concentration variability in air quality models. Atm Env (49): 348-360.

Ching, J., and M Majeed, 2011, An approach to characterize within-grid concentration variability in air quality models. Atm Env (49): 348-360.

Chen, Fei, H. Kusaka, R. Bornstein, **J. Ching**, C.S.B. Grimmond , S.Grossman-Clarke, T. Loridan, K.W. Manning, A.Martilli, S.Miao,D. Sailor, F.P. Salamanca, H.Taha, M.Tewari, X.Wang ,AA. Wyszogrodzki, C. Zhang: 2010: The integrated WRF/urban modeling system: development,evaluation, and applications to urban environmental problems. International Journal of Climatology, 2010

Ching, Jason, Adel Hanna, Fei Chen, Steven Burian and Torrin Hultgren: Facilitating advanced urban meteorology and air quality modeling capabilities with high resolution urban databases and access portal tools (2009): Book Chapter 1, Meteorology and Air Quality models for urban areas, Springer DOI 10.1007/978-3-642-00298-4 or e-ISBN 978-3-642-00298-4

Baklanov, Alexander, **Jason Ching**, CSB Grimmond, and Alberto Martilli: Model Urbanization strategy: Summaries, recommendations and requirements. (2009) Book Chapter 15: Meteorology and Air Quality models for urban areas, Springer DOI 10.1007/978-3-642-00298-4 or e-ISBN 978-3-642-00298-4

Ching, Jason, Michael Brown, Steven Burian, Fei Chen, Ron Cionco, Adel Hanna, Torrin Hultgren, Timothy McPherson, David Sailor, Haider Taha, and David Williams: "National Urban Database and Access Portal Tool (NUDAPT): (2009) Bulletin of American Meteorological Society, Vol 90(08) p1157-1168.

Pullen J, **Ching J**, Sailor D, Thompson W, Bornstein B, Koracin D. 2008.Progress toward meeting the challenges of our coastal urban future.*Bull. Am. Meteorol. Soc.* **89**(11): 1727–1731.

Isakov, Vlad., John.S. Irwin and **Jason.Ching, 2006:** Using CMAQ for Exposure Modeling and Characterizing the Sub-Grid Variability for Exposure Estimates, Golden Jubillee Special Issue of JAMC V46 1354-1371.

Ching,Jason, J.Herwehe and J. Swall: On joint deterministic grid modeling and sub-grid variability conceptual framework for model evaluation, Atmospheric Environment, 40 (2006) 4935-4945.

Dupont, Sylvain, Tanya L. Otte, and **Jason K.S. Ching**, 2004: Simulation of meteorological fields within and above urban and rural canopies with a mesoscale model (MM5) Boundary Layer Meteor., 2004 113: 111-158.

Otte, T. L., A. Lacser, S. Dupont, and **J. K. S. Ching**, 2004:Implementation of an urban canopy parameterization in a mesoscale meteorological model. J. Appl. Meteor., 43, 1648-1665.

Godowitch, J.M., **J.K.S. Ching** and J.F. Clarke, 1987: Spatial variation of the evolution and structure of the urban boundary layer. Boundary Layer Meteorol. 38:249272.

Clarke, J.F., **J.K.S. Ching**, J.M. Godowitch and F.S. Binkowski, 1987: Surface layer turbulence in an urban area. Modeling the Urban Boundary Layer. Am. Meteorol. Soc. Special Book, 542p.

Godowitch, J.M., **J.K.S. Ching** and J.F. Clarke, 1985: Evolution of the nocturnal inversion layer at an urban and non urban location. J. Clim. and Appl. Meteorol., 24(8):791804.

Ching, J.K.S., 1985: Urban scale variations of turbulence parameters and fluxes. Boundary Layer Meteorol., 33(4):335362.

Ching, J.K.S., J. F. Clarke, J. S. Irwin and J. M. Godowitch, 1983a: Relevance of mixed layer scaling for daytime dispersion based on RAPS and other field programs. Atm Env., 17(4):854871.

Ching, J.K.S., J.F. Clarke and J. M. Godowitch, 1983b: Modulation of heat flux by different scales of advection in an urban environment. Boundary Layer Meteorol., 25:171191.

Schiermeier, F. A., W.E. Wilson, F. Pooler, **J.K.S. Ching** and J.F. Clarke, 1979: Sulfur Transport and Transformation in the Environment (STATE): A major EPA research program. Bull. Am. Meteorol Soc., 60(11):1303‑1312.

Ching, J.K.S., 1976: Ship's influence on wind measurement determined from BOMEX mast and boom data. J. Appl. Meteorol., 15(1):102‑106.

Ching, J.K.S., 1975: Determining the drag coefficient from vorticity, momentum and mass budget analyses., J. Atm. Science 32(10):1898‑1908.

Ching, J.K.S., and J. A. Businger, 1968: The response of the planetary boundary layer to a time varying pressure gradient force. J. Atm. Science 25(6):1021‑1025.

PUBLICATIONS : TECHNICAL REPORTS

Burian, S., and **Jason Ching**, 2010: *Development of Gridded Fields of Urban Canopy Parameters for Advanced Urban Meteorological and Air Quality Models*. Project Report: EPA/600/R-10/007

U.S. Environmental Protection Agency. *Science algorithms of the EPA Models3 Community Multiscale Air Quality (CMAQ) modeling system.* D.W. Byun, and **J.K.S. Ching** (Eds.). EPA600/R99/030, National Exposure Research Laboratory, Research Triangle Park, NC (1999).

Ching, J.K.S., and D.W. Byun. Introduction to the Models3 framework and the Community Multiscale Air Quality (CMAQ) model. In U.S. Environmental Protection Agency. *Science algorithms of the EPA Models3 Community Multiscale Air Quality (CMAQ) modeling system.* D.W. Byun, and **J.K.S. Ching** (Eds.). EPA600/R99/030, National Exposure Research Laboratory, Research Triangle Park, NC (1999).

AMS: Modeling the Urban Boundary Layer (PI) ISBN 0-933876-68-8 pp541 (1987).

Ching, J.K.S., J. H. Novak, K.L. Schere, and F. A. Schiermeier, 1986: Reconciliation of urban emissions and corresponding ambient air concentrations using mass flow rate technique. ORD/USEPA Technical Report 59 p.

Ching, J.K.S. 1985: Review of complex terrain models. (One of three review articles in "Summary of complex terrain models evaluation") NTIS TB85-236891, Also EPA/600/3-85/060 p9-60.

Ching, J.K.S., 1985: Lecture Notes: Characteristics of atmospheric boundary layer and diffusion of air pollution. Electric Power Research Institute, Hydroelectric Power Department, Peoples Republic of China, 69 p.

White, F.D., **J.K.S. Ching,** R.L. Dennis, and W.H. Snyder, 1985: Summary of complex terrain model evaluation. EPA/6003-85/060, p124.

Clarke, J.F., **J.K.S. Ching** and J.M. Godowitch, 1982: An experimental study of turbulence in an urban environment. EPA/600/3-82/060, 151 p.

Ching, J.K.S., 1966: A comparative study of stress, wind, and wave development at different distances from a lee shore. Final Report, Aruda Expedition 1985, Observations and Analysis. NSF Grant 4711, Wooks Hole Oceanographic Institute, Reference 66-70, p39-145.

Blackadar, A.K., and **J.K.S. Ching**, 1965: Wind distribution in a steady state planetary boundary layer of the atmosphere with upward turbulent heat flux. Final Report, Contract No AF(604)-6641, Penn State U., AFCRL-65-531, p23-48.

CONFERENCE PROCEEDINGS

Bechtel, Benjamin, Mills, Gerald, See, Linda, **Ching, Jason**, Stewart, Iain, Alexander, Paul, Feddema, Johannes, Foley, Micheal, Keramitsoglou, Iphigenia, 2015: Local Climate Zones as a new standard for mapping urban areas? Proceedings, Mapping Urban Areas from Space Conference, Frascati, Rome, 4-5 Nov, Italy.

Dabberdt, W., **J. Ching,** 2014: Urban meteorological studies in the US. A selective historical overview-the last half century, Proceedings, 94th American Meteorological Society Annual Meeting, Atlanta GA.

Ching, J., 2013 Advancing urban canopy modeling and data needs for assessing urbanization and climate effects, Workshop: Urban Landscapes and Climate Change: From measurements to modeling, Argonne National Laboratory, August 27-28, 2013

Ching, J. Rich Rotunno, Peggy Lemone, Alberto Martilli, Branko Kosovich, Pedro Jimenez, and Jimy Dudhia, 2013: Mesoscale meteorological modeling at kilometer scale grid meshes for air quality simulations. CMAS Conference, Chapel Hill, NC October 28-30, 2013.

Ching, J. Rich Rotunno, Peggy Lemone, Alberto Martilli, Branko Kosovich, Pedro Jimenez, and Jimy Dudhia, 2013: Mesoscale meteorological modeling at kilometer scale grid meshes for air quality simulations. WRF User's Workshop, NCAR, Boulder, Co, June, 2013.

Ching, J. G Mills, J Feddema, K Oleson, L See, I Stewart, M Neophytou and A Hanna, 2013: Urban canopy modeling & data needs for weather , climate and air quality applications, community collaborations, CMAS Conference, Chapel Hill, NC October 28-30, 2013.

Ching, J. 2012: ICUC-8 Plenary Presentation, International community urban morphology database to support meso-urban and climate models. ICUC-8 Dublin, Ireland, International Association Urban Climate, August 6-10, 2012

Glotfelty, T., **J. Ching**, M. Tewari and F. Chen, 2012: NUDAPT 44 City UCP database for Urbanized WRF Application, ICUC-8, Dublin, Ireland, International Association Urban Climate, August 6-10, 2012

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Ching, J., 2011: Fine Scale Meteorology & Air Quality Models; Urban Forecasting, planning and assessment tools, **Croucher Advanced Study Institute 2011-2012**Urban Climatology for Tropical & Sub-tropical Regions, Hong Kong Dec 2011.

Glotfelty T., **J. Ching,** M Tewari, F. Chen and S Burian. 2011: Implementing NUDAPT Urban Canopy Parameters for 44 Cities in WRF, CMAS 2011 Conference, Chapel Hill, NC October 24-26, 2011.

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