

Arthur W. H. Chan, Ph.D.

CONTACT INFORMATION

Department of Chemical Engineering and Applied Chemistry
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EDUCATION

Ph.D., Chemical Engineering, California Institute of Technology, 2010
M.Sc., Chemical Engineering, California Institute of Technology, 2007
B.S., Chemical and Biomolecular Engineering, University of Pennsylvania, 2005

RESEARCH EXPERIENCE

University of Toronto, Toronto, Ontario, Canada
Department of Chemical Engineering and Applied Chemistry
Assistant Professor, Apr 2013 – present

University of California at Berkeley, Berkeley, California, U.S.A.
Department of Environmental Science, Policy and Management
Postdoctoral Researcher, August 2010 – March 2013

- Research Topic: Measurement of Ambient Aerosol Composition Using Thermal Desorption Gas-Chromatography/Mass Spectrometry
- Advisor: Professor Allen H. Goldstein

California Institute of Technology, Pasadena, California, U.S.A.
Department of Chemical Engineering
Ph.D. Student, September 2005 – July 2010

- Thesis: *Chamber Studies and Modeling of Secondary Organic Aerosol Formation*
- Advisors: Professors John H. Seinfeld and Richard C. Flagan

University of Pennsylvania, Philadelphia, Pennsylvania, U.S.A.
Department of Chemical and Biomolecular Engineering
Undergraduate Research Assistant, January 2004 – May 2004

- Topic: *Diffusional limitations of solid oxide fuel cells*
- Advisor: Dr. John Vohs

University of Pennsylvania, Philadelphia, Pennsylvania, U.S.A.
Department of Chemical and Biomolecular Engineering
Undergraduate Research Assistant, May 2004 – May 2005

- Recipient of Research Experience for Undergraduates (REU) grant
- Topic: *Computer simulation of batch chemical processes*
- Advisor: Dr. Warren Seider

AWARDS AND HONORS

Connaught New Researcher Award, 2013
California Institute of Technology Graduate Dean's Award for Outstanding Leadership, 2010
National Science Foundation Graduate Research Fellowship, Honorable Mention, 2006,

2007

University of Pennsylvania Hugo Otto Wolf Memorial Prize, 2005

University of Pennsylvania Dean's List, 2001–2005

American Institute of Chemical Engineers Delaware Valley Section Award, 2004

PUBLICATIONS

Zhao, Y.; Kreisberg, N. M.; Worton, D. R.; Isaacman, G.; Gentner, D. R.; **Chan, A. W. H.**; Weber, R.; Liu, S.; Day, D. A.; Russell, L. M.; Hering, S. V.; Goldstein, A. H. Sources of organic aerosol investigated using organic compounds as tracers measured during CalNex in Bakersfield. *J. Geophys. Res. Atmos.*, *118*, doi:10.1002/jgrd.50825, 2013

Yee, L. D.; Kautzman, K. E.; Loza, C. L.; Schilling, K. A.; Coggon, M. M.; Chhabra, P. S.; Chan, M. N.; **Chan, A. W. H.**; Hersey, S. P.; Crouse, J. D.; Wennberg, P. O.; Flagan, R. C.; Seinfeld, J. H. Secondary organic aerosol formation from biomass burning intermediates: phenol and methoxyphenols. *Atmos. Chem. Phys.*, *13*, 8019–8043, 2013.

Chan, A. W. H.; Isaacman, G.; Wilson, K. R.; Worton, D. R.; Ruehl, C. R.; Nah, T.; Gentner, D. R.; Dallmann, T. R.; Kirchstetter, T. W.; Harley, R. A.; Gilman, J. B.; Kuster, W. C.; de Gouw, J. A.; Offenberg, J. H.; Kleindienst, T. E.; Lin, Y. H.; Rubitschun, C. L.; Surratt, J. D.; Hayes, P. L.; Jimenez, J. L.; Goldstein, A. H. Detailed chemical characterization of Unresolved Complex Mixtures (UCM) in atmospheric organics: Insights into emission sources, atmospheric processing and secondary organic aerosol formation. *J. Geophys. Res. Atmos.*, *118*, 1–14, doi: 10.1002/jgrd.50533, 2013

Isaacman, G.; **Chan, A. W. H.**; Nah, T.; Worton, D. R.; Ruehl, C. R.; Wilson, K. R.; Goldstein, A. H. Heterogeneous OH oxidation of motor oil particles causes selective depletion of branched and less cyclic hydrocarbons. *Environ. Sci. Technol.*, *46*, 10632–10640, 2012

Gentner, D. R.; Isaacman, G.; Worton, D. R.; Chan, A. W. H.; Dallmann, T. R.; Davis, L.; Liu, S.; Day, D. A.; Russell, L. M.; Wilson, K. R.; Weber, R.; Guha, A.; Harley, R. A.; Goldstein, A. H. Elucidating secondary organic aerosol from diesel and gasoline vehicles through detailed characterization of organic carbon emissions. *Proc. Natl. Acad. USA*, *109*, 18318–18323, 2012

Kwan, A. J.; **Chan, A. W. H.**; Ng, N. L.; Kjaergaard, H. G.; Seinfeld, J. H.; Wennberg, P. O. Peroxy radical chemistry and OH radical production during the NO₃-initiated oxidation of isoprene. *Atmos. Chem. Phys.*, *12*, 7499–7515, 2012

Isaacman, G.; Wilson, K. R.; **Chan, A. W. H.**; Worton, D. R.; Kimmel, J. R.; Nah, T.; Hohaus, T.; Gonin, M.; Kroll, J. H.; Worsnop, D. R.; Goldstein, A. H. Improved resolution of hydrocarbon structures and constitutional isomers in complex mixtures using Gas Chromatography-Vacuum Ultraviolet-Mass Spectrometry (GC-VUV-MS). *Anal. Chem.*, *84*, 2335–2342, 2012

Galloway, M. M.; Loza, C. L.; Chhabra, P. S.; **Chan, A. W. H.**; Yee, L. D.; Seinfeld, J. H.; Keutsch, F. N. Analysis of photochemical and dark glyoxal uptake: Implications for SOA formation. *Geophys. Res. Lett.* *38*, L17811, doi:10.1029/2011GL048514, 2011

Yasmeen, F.; Szmigielski, R.; Vermeylen, R.; Gomez-Gonzalez, Y.; Surratt, J. D.; **Chan, A. W. H.**; Seinfeld, J. H.; Maenhaut, W.; Claeys, M. Mass spectrometric

characterization of isomeric terpenic acids from the oxidation of α -pinene, β -pinene, *d*-limonene, and Δ^3 -carene in fine forest aerosol. *J. Mass. Spectrom.* 46, 425–442, 2011

Galloway, M. M.; Huisman, A. J.; Yee, L. D.; **Chan, A. W. H.**; Loza, C. L.; Seinfeld, J. H.; Keutsch, F. N. Yields of oxidized volatile organic compounds during the OH radical initiated oxidation of isoprene, methyl vinyl ketone, and methacrolein under high-NO_x conditions. *Atmos. Chem. Phys.*, 11, 10779–10790, 2011

Chan, M. N.; Surratt, J. D.; **Chan, A. W. H.**; Schilling, K.; Offenberg, J. H.; Lewandowski, M.; Edney, E. O.; Kleindienst, T. E.; Jaoui, M.; Edgerton, E. S.; Tanner, R. L.; Shaw, S. L.; Zheng, M.; Knipping, E. M.; Seinfeld, J. H. Influence of aerosol acidity on the chemical composition of secondary organic aerosol from beta-caryophyllene. *Atmos. Chem. Phys.*, 11, 1735–1751, 2011

Pye, H. O. T.; **Chan, A. W. H.**; Barkley, M. P.; Seinfeld, J. H. Global modeling of organic aerosol: the importance of reactive nitrogen (NO_x and NO₃), *Atmos. Chem. Phys.*, 10, 11261–11276, 2010

Chan, A. W. H.; Chan, M. N.; Surratt, J. D.; Chhabra, P. S.; Loza, C. L.; Crouse, J. D.; Yee, L. D.; Flagan, R. C.; Wennberg, P. O.; Seinfeld, J. H. Role of aldehyde chemistry and NO_x concentrations on secondary organic aerosol formation. *Atmos. Chem. Phys.* 10, 7169–7188, 2010

Loza, C. L.; **Chan, A. W. H.**; Galloway, M. M.; Keutsch, F. N.; Flagan, R. C.; Seinfeld, J. H. Characterization of vapor wall loss in laboratory chambers. *Environ. Sci. Technol.* 44, 5074–5078, 2010

Surratt, J. D.; **Chan, A. W. H.**; Eddingsaas, N. C.; Chan, M. N.; Loza, C. L.; Kwan, A. J.; Hersey, S. P.; Flagan, R. C.; Wennberg, P. O.; Seinfeld, J. H. Reactive intermediates revealed in secondary organic aerosol formation from isoprene. *Proc. Natl. Acad. Sci. USA* 107, 6640–6645, 2010

Kautzman, K. E.; Surratt, J. D.; Chan, M. N.; **Chan, A. W. H.**; Hersey, S. P.; Chhabra, P. S.; Dalleska, N. F.; Wennberg, P. O.; Flagan, R. C.; Seinfeld, J. H. Chemical composition of gas- and aerosol-phase products from the photooxidation of naphthalene. *J. Phys. Chem. A* 114, 913–934, 2010

Claeys, M.; Iinuma, Y.; Szmigielski, R.; Surratt, J. D.; Blockhuys, F.; Van Alsenoy, C.; Boge, O.; Sierau, B.; Gomez-Gonzalez, Y.; Vermeylen, R.; Van der Veken, P.; Shahgholi, M.; **Chan, A. W. H.**; Herrmann, H.; Seinfeld, J. H.; Maenhaut, M. Terpenylic acid and related compounds from the oxidation of alpha-pinene: Implications for new particle formation and growth above forests. *Environ. Sci. Technol.* 43, 6976–6982, 2009

Chan, M. N.; **Chan, A. W. H.**; Chhabra, P. S.; Surratt, J. D.; Seinfeld, J. H. Modeling of secondary organic aerosol yields from laboratory chamber data. *Atmos. Chem. Phys.* 9, 5669–5680, 2009

Galloway, M. M.; Chhabra, P. S.; **Chan, A. W. H.**; Surratt, J. D.; Flagan, R. C.; Seinfeld, J. H.; Keutsch, F. N. Glyoxal uptake on ammonium sulphate seed aerosol: reaction products and reversibility of uptake under dark and irradiated conditions. *Atmos. Chem. Phys.* 9, 3331–3345, 2009

Chan, A. W. H.; Kautzman, K. E.; Chhabra, P. S.; Surratt, J. D.; Chan, M. N.; Crouse, J. D.; Kürten, A.; Wennberg, P. O.; Flagan, R. C.; Seinfeld, J. H. Secondary

organic aerosol formation from photooxidation of naphthalene and alkyl-naphthalenes: Implications for oxidation of intermediate volatility organic compounds (IVOCs). *Atmos. Chem. Phys.*, 9, 3049–3060, 2009

Chan, A. W. H.; Galloway, M. M.; Kwan, A. J.; Chhabra, P. S.; Keutsch, F. N.; Wennberg, P. O.; Flagan, R. C.; Seinfeld, J. H. Photooxidation of 2-methyl-3-buten-2-ol (MBO) as a potential source of secondary organic aerosol. *Environ. Sci. Technol.* 43, 4647–4652, 2009

Ng, N. L.; Kwan, A. J.; Surratt, J. D.; **Chan, A. W. H.**; Chhabra, P. S.; Sorooshian, A.; Pye, H. O. T.; Crouse, J. D.; Wennberg, P. O.; Flagan, R. C.; Seinfeld, J. H. Secondary organic aerosol (SOA) formation from reaction of isoprene with nitrate radicals (NO_3). *Atmos. Chem. Phys.* 8, 4117–4140, 2008

Surratt, J. D.; Gomez-Gonzalez, Y.; **Chan, A. W. H.**; Vermeylen, R.; Shahgholi, M.; Kleindienst, T. E.; Edney, E. O.; Offenberg, J. H.; Lewandowski, M.; Jaoui, M.; Maenhaut, W.; Claeys, M.; Flagan, R. C.; Seinfeld, J. H. Organosulfate formation in biogenic secondary organic aerosol. *J. Phys. Chem. A* 112, 8345–8378, 2008

Ng, N. L.; Chhabra, P. S.; **Chan, A. W. H.**; Surratt, J. D.; Kroll, J. H.; Kwan, A. J.; McCabe, D. C.; Wennberg, P. O.; Sorooshian, A.; Murphy, S. M.; Dalleska, N. F.; Flagan, R. C.; Seinfeld, J. H. Effect of NO_x level on secondary organic aerosol (SOA) formation from the photooxidation of terpenes. *Atmos. Chem. Phys.* 7, 5159–5174, 2007

Chan, A. W. H.; Kroll, J. H.; Ng, N. L.; Seinfeld, J. H. Kinetic modeling of secondary organic aerosol formation: effects of particle- and gas-phase reactions of semivolatile products. *Atmos. Chem. Phys.* 7, 4135–4147, 2007

Sorooshian, A.; Ng, N. L.; **Chan, A. W. H.**; Feingold, G.; Flagan, R. C.; Seinfeld, J. H. Particulate organic acids and overall water-soluble aerosol composition measurements from the 2006 Gulf of Mexico Atmospheric Composition and Climate Study (GoMACCS). *J. Geophys. Res.* 112, D13201, doi:10.1029/2007JD008537

Ng, N. L.; Kroll, J. H.; **Chan, A. W. H.**; Chhabra, P. S.; Flagan, R. C. and Seinfeld, J. H. Secondary organic aerosol formation from *m*-xylene, toluene, and benzene. *Atmos. Chem. Phys.* 7, 3902–3922, 2007

Kroll, J. H.; **Chan, A. W. H.**; Ng, N. L.; Flagan, R. C. and Seinfeld, J. H. Reactions of semivolatile organics and their effects on secondary organic aerosol formation. *Environ. Sci. Technol.* 41, 3545–3550, 2007

CONFERENCE
PRESENTATIONS
AND INVITED
TALKS

Probing Complex Hydrocarbon Mixtures in Atmospheric Organic Aerosols: Insights into Sources and Mechanisms, American Association for Aerosol Research Fall Meeting, Minneapolis, MN, October 2012 (oral presentation)

Characterizing Sources and Formation of Atmospheric Organic Aerosols, AQRD Expert Seminar, Environment Canada, Toronto, Ontario, Canada, October 2012 (invited talk)

Unraveling a Smoggy Mystery: Characterizing Sources and Formation of Atmospheric Organic Aerosols, Department of Chemical Engineering and Applied Chemistry, University of Toronto, Ontario, Canada, May 2012 (invited talk)

Exploring the Complexity of Urban Organic Aerosol: Speciated Organics Measurements using GC×GC-HR-TOFMS, presented at American Geophysical Union Fall Meeting, San Francisco, CA, December 2011 (oral presentation)

SOA Formation from Aldehydes: Role of NO_x and Molecular Structure, American Association for Aerosol Research Fall Meeting, Portland, OR, October 2010 (oral presentation)

Sources and Mechanisms of Secondary Organic Aerosol Formation: Chamber and Modeling Studies, Department of Environmental Sciences, Policy and Management, University of California, Berkeley, CA, March 2010 (invited talk)

Mechanism of secondary organic aerosol (SOA) formation from isoprene photooxidation, American Geophysical Union Fall Meeting, San Francisco, CA, December 2009 (oral presentation)

Secondary organic aerosol formation from isoprene: Role of epoxydiol intermediate under low-NO_x conditions, American Association for Aerosol Research Fall Meeting, Minneapolis, MN, October 2009 (poster presentation)

Secondary organic aerosol formation from isoprene: Mechanism and yields under high-NO_x conditions, American Association for Aerosol Research Fall Meeting, Minneapolis, MN, October 2009 (poster presentation)

Sources and Mechanisms of Secondary Organic Aerosol Formation: Chamber and Modeling Studies, Department of Chemical and Biomolecular Engineering, Hong Kong University of Science and Technology, Hong Kong, December 2008 (invited talk)

Secondary organic aerosol (SOA) formation from photooxidation of naphthalene and alkylnaphthalenes, American Association for Aerosol Research Fall Meeting, Orlando, FL, October 2008 (poster presentation)

TEACHING
EXPERIENCE

University of Toronto, Toronto, Ontario, Canada

- Instructor for CHE 249: Engineering Economic Analysis (Fall 2013)

University of California, Berkeley, California

- Guest Lecturer for ESPM C180: Air Pollution (Fall 2011, 2012)

California Institute of Technology, Pasadena, California

- Recitation leader & Grader for ESE 171: Atmospheric Chemistry I (Spring 2007)
- Recitation leader & Grader for ChE 64: Principles of Chemical Engineering (Fall 2007 & Fall 2008)

University of Pennsylvania, Philadelphia, Pennsylvania

- Recitation leader & Grader for CBE 460: Chemical Process Control (Spring 2005)

PROFESSIONAL
ACTIVITIES

Member of American Association for Aerosol Research (AAAR) and American Geophysical Union (AGU)

Session chair at AAAR Annual Conference 2010, 2012, 2013

Reviewer for *Environmental Science and Technology*, *Atmospheric Environment*, *Atmospheric Chemistry and Physics*, *Journal of Geophysical Research*, *Journal of Air and Waste Management*, *Aerosol Science and Technology*

Judge for Outstanding Student Presentation Award (OSPA) at AGU Fall Meeting 2011