

# CURRICULUM VITAE

Date: October, 2002

NAME: Helen H. Suh

ADDRESS: 15 Bertrand Road, Newton, MA 02466

DATE & PLACE OF BIRTH: August 23, 1963; Pittsburgh, PA

## EDUCATION:

Date	Discipline	Degree	Institution
1993	Environmental Health	Sc.D.	Harvard University, School of Public Health
1990	Environmental Health	M.S.	Harvard University, School of Public Health
1985	Biology	S.B.	Massachusetts Institute of Technology

## POSTDOCTORAL TRAINING (if applicable):

### Research Fellowships

Dates	Field of Research	Place	Title (if applicable)
1994, 1995	Indoor Air	Harvard School of Public Health	Center for Indoor Air Research
1992, 1993	Environmental Health	Harvard School of Public Health	National Research Service Award, NIH

## ACADEMIC APPOINTMENTS:

Dates	Title	Department	Institution
July 1997-present	Asst. Professor	Environmental Health	Harvard School of Public School
Nov 1994-June 1997	Instructor	Environmental Health	Harvard School of Public Health
1993 - July 1997	Research Assoc.	Environmental Health	Harvard School of Public Health

HONORS AND DISTINCTIONS:

- 1999            Yaglou Award, International Academy of Indoor Air Sciences
- 1998            Scientific and Technological Achievement Award, Second Level Award for paper "Fine and Coarse Particles: Concentration Relationships Relevant to Epidemiological Studies", U.S. EPA
- 1990            Switzer Foundation Environmental Fellow, Switzer Foundation

MAJOR PROFESSIONAL SERVICE:

National Service, Date(s):

Invited Speaker, National Institute of Environmental Health Sciences, Use of Exposure Assessment in Air Pollution Epidemiology, Spring 2002

Member, Committee on Chemical Exposures, Longitudinal Cohort Study of Environmental Effects on Child Health and Development, Fall 2001

Invited Speaker, National Research Council, National Academy of Science Workshop on Research Progress in Particulate Matter Health Effects, "Implications of Particulate Exposure Assessment on Epidemiology and Toxicology", fall 2001

Member, Peer Review Panel, MBTA Silver Line Project, Winter 2001

Member, Review panel, 1999 EPA-draft Criteria Document for Particulate Matter, 1999

Invited Participant, NHEXAS Data Analysis Workshop, U.S. EPA, 1999

Invited Speaker, Workshop on the Imputation of Long-Term Exposures to Particulate Matter for Epidemiological Studies, U.S. EPA, 1999

Member, Review Panel, EPA Panel Studies of Particulate Exposure, U.S. EPA, 1999

International Service, Date(s):

Reviewer, Draft Report on the Assessment of Health Effects of Sulfur Dioxide in Indoor Air, Health Canada, Spring 2002

Member, Technical Advisory Board, Annual Meeting for the International Society of Exposure Analysis, October 2000, Monterey, CA, 1999-2000

Councilor, International Society of Exposure Analysis, 1998-2000



## PROFESSIONAL SOCIETIES:

1993	Air and Waste Management Association
1993	American Chemical Society
1993	American Association for the Advancement of Science
1994	International Society of Exposure Analysis
1994	International Society for Environmental Epidemiology

## OTHER PUBLIC SERVICE:

1999-2001	Member, Faculty Council, Harvard School of Public Health
1994-1997	Member, Board of Directors, Shelter, Inc., Cambridge, MA

## MAJOR RESEARCH INTERESTS:

Dr. Suh's research is multi-disciplinary and sits at the interface of the more traditional departmental research on exposure assessment and epidemiology. Her research includes studies focusing on primarily three areas: (1) the effect of exposure error, exposure modification and confounding on epidemiology and toxicology, (2) the contribution of indoor and outdoor sources to air pollutant exposures, and (3) the impact of these exposures on cardiovascular health.

Over the next three to five years, Dr. Suh plans to continue to expand her research (1) investigating the impact of exposure variability on air pollution health effects in epidemiological and toxicological studies and (2) estimating chronic exposure assessment for ambient air pollutants. This research will be conducted as part of existing grants and also as part of new research, either currently proposed or to be proposed.

## RESEARCH SUPPORT (as PI or Co-PI only):

Past Funding (last 10 years):	Year(s)	Funding Source	PI/Co-PI?	Grant Title
•		"Measurement of Indoor Particulate Source Strengths Using Semi-Continuous Particulate Monitors" sponsored by the Center for Indoor Air Research (Co-Principal Investigator); Feb 1996-Jun 2003.		
•		"Personal Exposure and Indoor Modeling Studies of Particles" sponsored by the Electric Power Research Institute and the American Petroleum Institute (Co-Principal Investigator); 1997-1999.		
•		"Investigation of Human Exposures to Urban Air Pollutants" (research associate) conducted in collaboration with the U.S. Environmental Protection Agency, 1993-1996.		

Current Funding: Year(s)	Funding Source	PI/Co-PI?	Grant Title
			<ul style="list-style-type: none"> <li>• “Detailed Characterization of Factors affecting Indoor PM<sub>2.5</sub> Concentrations” sponsored by the California Air Resources Board (Principal Investigator); Mar 2000-Jul 2003.</li> </ul>
			<ul style="list-style-type: none"> <li>• “Characterization of Multi-Pollutant Exposures” sponsored jointly by the Ohio Coal and Development Office, the U.S. Department of Energy, and the Electric Power Research Institute (Principal Investigator); Dec 2000-Jun 2003 (EPRI); Jan 2000-Dec 2002 (DOE).</li> </ul>
			<ul style="list-style-type: none"> <li>• “Characterization of Personal, Indoor, and Outdoor PM<sub>2.5</sub> Exposures: Composition and Health Effects” sponsored jointly by the Electric Power Research Institute and the American Petroleum Institute (Principal Investigator); Apr 1999-Dec 2002.</li> </ul>
			<ul style="list-style-type: none"> <li>• “Speciation of Personal PM<sub>2.5</sub> Exposures for Individuals with COPD Living in the Los Angeles Metropolitan Area” sponsored by the California Air Resources Board (Principal Investigator); Jun 1999-May 2002.</li> </ul>
			<ul style="list-style-type: none"> <li>• “Ambient Particle Health Effects: Exposure, Susceptibility, and Mechanisms” sponsored by the U.S. Environmental Protection Agency (Co-Investigator); June 1999-May 2004.</li> </ul>
			<ul style="list-style-type: none"> <li>• “Assessing Human Exposures to Particulate Matter for High-Risk Subpopulations” sponsored by the U.S. Environmental Protection Agency (Co-Principal Investigator); Oct 1998-Sept 2003.</li> </ul>
			<ul style="list-style-type: none"> <li>• “Characterization of Particulate and Gaseous Exposures for Sensitive Sub-groups Living in the Eastern U.S.” sponsored by the Health Effects Institute (Co-Principal Investigator); Aug 1998-Dec 2002.</li> </ul>
			<ul style="list-style-type: none"> <li>• “Ambient Particles and Cardiac Vulnerability in Humans” program project sponsored by the National Institute of Environmental Health Sciences (Co-Investigator); Sept 1999-Aug 2004.</li> </ul>
			<p>Pending:</p> <ul style="list-style-type: none"> <li>• “Particulate Air Pollution and Myocardial Infarctions” submitted to U.S. EPA; co-investigator (J. Schwartz, PI)</li> <li>• “Chronic Exposure to Particle Matter and Cardiopulmonary Disease” submitted to U.S. EPA; co-investigator (F. Laden, PI)</li> <li>• “Heart Attacks and Traffic Pollution” submitted to National Institute of Environmental Health Science; co-investigator (J. Schwartz, PI)</li> </ul>

## TEACHING EXPERIENCE

Date	Title	Institution	Experience
Spring 2002	Analytical Methods and Exposure Assessment (EH263cd)	HSPH	Co-Director
Spring 2001	Introduction to Environmental Health (EH202d)	HSPH	Lecturer
Spring 2000	Analytical Chemistry and Exposure Assessment (EH263cd)	HSPH	Co-Director
Spring 2000	Introduction to Environmental Health (EH202d)	HSPH	Lecturer
Spring 2000	Exposure Assessment for Environmental and Occupational Epidemiology (EH269cd)	HSPH	Lecturer
Spring 2000	Introduction to Environmental Health (EH202d)	HSPH	Lecturer
Spring 1998	Analytical Chemistry and Exposure Assessment (EH263cd)	HSPH	Co-Director
Spring 1998	Exposure Assessment for Environmental and Occupational Epidemiology (EH269cd)	HSPH	Co-Director
Fall 1998	Air Pollution	HSPH	Lecturer

## Graduation

Date	Name	Degree	Institution	Role
1998	Tina Bahadori	Sc.D.	HSPH	Research Committee
1999	Eileen Abt	Sc.D.	HSPH	Research Committee
2000	Leonora Rojas-Bracho	Sc.D.	HSPH	Research Committee
2000	Annie Oh	Sc.D.	HSPH	Research Committee
2000	Chris Long	Sc.D.	HSPH	Research Committee
2000	Pete Babich	Sc.D.	HSPH	Research Committee
2000	Swati Prakash	M.S.	HSPH	Advisor
2000	Usma Khan	M.S.	HSPH	Advisor
2000	Anjali Garg	M.S.	HSPH	Advisor
2000	Jason Baker	M.S.	HSPH	Advisor
2002	Candace Chiang	M.S.	HSPH	Advisor
2001	Li-Te Chang	Sc.D.	HSPH	Advisor
2001	Jeremy Sarnat	Sc.D.	HSPH	Advisor
2004	Stefanie Ebel	Sc.D.	HSPH	Advisor
2005	Sara Dubowsky	Sc.D.	HSPH	Advisor
2003	Ted Myatt	Sc.D.	HSPH	Research Committee
2003	Sonja Ramstrom	Sc.D.	HSPH	Research Committee
2005	Pablo Ruiz	Sc.D.	HSPH	Research Committee
2005	Kathleen Brown	Sc.D.	HSPH	Research Committee

Date	Name	Degree	Institution	Role
2001	Nicole Janssen	Visiting Scientist	HSPH	Sponsor
1998-	Amanda Wheeler	Research Fellow	HSPH	Supervisor
2001-	Li-Te Chang	Research Fellow	HSPH	Supervisor

## BIBLIOGRAPHY

## Peer-Review Journals

1. Brauer M, Ryan PB, Suh HH, Koutrakis P, Spengler JD. Measurements of nitrous acid inside two research houses. *Environ Sci Technol* 1990; 24:1521-1527.
2. Suh HH, Spengler JD, Koutrakis P. Personal exposures to acid aerosols and ammonia. *Environ Sci Technol* 1992; 26:2507-2517.
3. Suh HH, Koutrakis P, Spengler JD. Validation of personal exposure models for sulfates and aerosol strong acidity. *JAWMA* 1993; 43:845-850.
4. Liu LS, Koutrakis P, Suh HH, Mulik JD, Burton RM. Use of personal measurements for ozone exposure assessment: a pilot study. *Environ Health Perspect* 1993; 101:318-324.
5. Suh HH, Koutrakis P, Spengler JD. The relationship between aerosol acidity and ammonia in indoor environments. *J Expos Anal Environ Epidem* 1994; 4:1-22.
6. Suh HH, Allen GA, Aurian-Blajeni B, Koutrakis P. Field method intercomparison for the characterization of acid aerosols and gases. *Atmos Environ* 1994; 28:2981-89.
7. Suh HH, Koutrakis P, Allen GA, Burton RM. Spatial variation in outdoor acidic sulfate and ammonia concentrations within metropolitan Philadelphia. *JAWMA* 1995; 45:442-52.
8. Burton RM, Suh HH, Koutrakis P. Characterization of outdoor particle concentrations within metropolitan Philadelphia. *Environ Sci Technol* 1996; 30:400-7.
9. Wilson WE, Suh HH. Fine and coarse particles: concentration relationships relevant to epidemiologic studies. *JAWMA* 1997; 47:1238-49.
10. Suh HH, Nishioka Y, Koutrakis P, Burton RM. The Metropolitan Acid Aerosol Characterization Study: results from Washington, DC *Environ Health Perspect* 1997; 105:826-34.
11. Bahadori T, Suh HH, Koutrakis P. Issues in human particulate exposure assessment: relationship between outdoor, indoor, and personal exposures. *J Human Ecological Risk Assess* 1999; 5:459-70.
12. Chang L-T, Sarnat J, Wolfson JM, Rojas-Bracho L, Suh HH, Koutrakis P. Development of a personal multi-pollutant exposure sampler for particulate matter and criteria Gases. *Pollution Atmosphérique* 1999; 10:31-9.
13. Abt E, Suh HH, Allen GA, Koutrakis P. Characterization of indoor particle sources: a study conducted in the metropolitan Boston area. *Environ Health Perspect* 2000; 108:35-44.
14. Abt E, Suh H, Catalano P, Koutrakis P. Relative contribution of outdoor and indoor particle sources to indoor concentrations. *Environ. Sci Technol* 2000; 34:3579-87.

15. Rojas-Bracho L, Suh H, Koutrakis P. Relationship among personal, indoor, and outdoor fine and coarse particulate concentrations for individuals with COPD. *J Exposure Anal Environ Epidemiol*. 2000; 10:294-306.
16. Sarnat J, Koutrakis P, Suh HH. Assessing the relationship between personal particulate and gaseous exposures of senior citizens living in Baltimore, MD. *JAWMA*. 2000; 50:1184-98.
17. Chang LT, Koutrakis P, Catalano P, Suh HH. Hourly personal exposures to fine particles and gaseous pollutants-results from Baltimore, MD. *JAWMA*. 2000; 50:1223-35.
18. Long CM, Suh HH, Koutrakis P. Characterization of indoor particle sources using continuous mass and size monitors. *JAWMA*. 2000; 50:1236-50.
19. Suh HH, Bahadori T, Vallarino J, Spengler JD. Criteria air pollutants and toxic air pollutants. *Environ Health Perspect*. 2000; 108:625-33.
20. Long CM, Suh HH, Kobzik L, Catalano PJ, Ning YY, Koutrakis P. A pilot investigation of the relative toxicity of indoor and outdoor fine particles: *in vitro* effects of endotoxin and other particulate properties. *Environ Health Perspect*. 2001; 109:1019-26.
21. Long, CM, Suh, HH, Catalano PJ, Koutrakis P. Using time- and size-resolved particulate data to quantify indoor penetration and deposition behavior. *Environ Sci Technol*. 2001; 35:2089-99.
22. Sarnat JA, Schwartz J, Catalano PJ, Suh HH. Gaseous pollutants in particulate matter epidemiology: confounders or surrogates? *Environ Health Perspect*. 2001; 109:1053-61.
23. Chang L-T, Suh HH, Wolfson JM, Misra K, Allen GA, Catalano PJ, Koutrakis P. Laboratory and field evaluation of measurement methods for one-hour exposures to O<sub>3</sub>, PM<sub>2.5</sub> and CO. *JAWMA*. 2001; 51:1414-22.
24. Janssen NAH, Schwartz J, Zanobetti A, Suh HH. Air conditioning and source-specific particles as modifiers of the effect of PM<sub>10</sub> on hospital admissions for heart and lung disease. *Environ Health Perspect*. 2002; 110:43-9.
25. Saldiva HN, Clarke RW, Coull BA, Stearns R, Lawrence J, Krishna MG, Diaz E, Koutrakis P, Suh H, Tsuda A, Godleski JG. Lung inflammation induced by concentrated ambient air particles is related to particle composition. "in press". *J Respir Critical Care Medicine*.
26. Rojas-Bracho, L, Suh HH, Oyola P, Koutrakis P. Measurements of children's exposures to particles and nitrogen dioxide in Santiago, Chile. *Sci Total Environ*. 2002; 287:249-264.
27. Sarnat JA, Koutrakis P, Long CM, Coull B, Schwart J, Suh HH. Using sulfur as a tracer for outdoor fine particulate matter. *Environ. Sci. Technol*. in press.

Chapter in Book

1. Suh HH, Koutrakis P. Acid Aerosol Exposures and Health. In: Majumdar SK, Miller EW, Brenner FJ, eds. Environmental Contaminants, Ecosystems and Human Health. Easton, PA: Pennsylvania Academy of Science, 1995:198-215.
2. Suh HH. Exposure Assessment for Environmental Epidemiology: Particulate Matter as a Case Study. In: M. Nieuwenhuijsen ed. Exposure Assessment for Environmental and Occupational Epidemiology. Oxford University Press, Oxford, England, 2003.