Sa Liu, PhD, MPH, CIH
Assistant Professor
Occupational and Environmental Health Sciences/Industrial Hygiene
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EDUCATION

2010   **University of California, Berkeley, Ph.D. in Environmental Health Sciences**.
Dissertation: "Assessing exposures to particulate matter and manganese in welding fumes." Exam fields: Exposure Assessment, Statistical Modeling, Occupational Health.

2005   **University of California, Berkeley, M.P.H. in Industrial Hygiene**.

2001   **University of Idaho (Moscow, ID), M.S. in Environmental Sciences.**
Thesis: "Mechanism of Nitroaromatic Compound Degradation in Modified Fenton's System." Exam fields: Environmental Sciences, Chemistry

1999   **Tianjin University (Tianjin, China), M.S. in Civil Engineering.**
Thesis: "Study on Anaerobic Fast Absorption Wastewater Treatment by Periodical Simulation." Exam fields: Environmental Engineering, Wastewater Treatment

1992   **Nankai University (Tianjin, China), B.A. in Chemistry.**

PROFESSIONAL EXPERIENCE

2018-present   **Assistant Professor, Occupational and Environmental Health/Industrial Hygiene,** School of Health Sciences, Purdue University

2017-2018   **Associate Researcher, Division of Environmental Health Sciences,** School of Public Health, University of California, Berkeley

2012-2017   **Assistant Researcher, Division of Environmental Health Sciences,** School of Public Health, University of California, Berkeley.

2013-2018   **Assistant Director, Industrial Hygiene Program,** Center for Occupational and Environmental Health, Northern California, University of California, Berkeley.

2016-2018   **Lecturer and Co-Instructor,** School of Public Health, UC Berkeley.

2010-2012   **Health & Safety Engineer, Lawrence Berkeley National Laboratory,** Berkeley, California.

| 2001-2003 | **Environmental Specialist,** Onyx Environmental Services, L.L.C., Fremont, California. |
| 1992-1999 | **Chemist,** Plant and Research Institute of Sewage and Wastewater Treatment, Tianjin, China. |

LICENSURE

| 2012-Present | **Certified Industrial Hygienist (CIH), Specialty: Comprehensive Practice** |
| | American Board of Industrial Hygiene #10076 |

PREFESSIONAL SOCIETY MEMBERSHIP

2005-present	Member of the American Conference of Governmental Industrial Hygienists
2018-present	Member of the American Industrial Hygiene Association
2018-present	Member of the International Society of Exposure Science

TEACHING EXPERIENCE

2021-present	**Advanced Topics in Exposure Assessment** (HSCI590), School of Health Sciences, Purdue University
2020-present	**Introduction to Occupational and Environmental Health Sciences** (HSCI345), School of Health Sciences, Purdue University
2019, 2022	**Introduction of Environmental Health** (HSCI575), School of Health Sciences, Purdue University.
2013-2018	**Characterization of Airborne Contaminants** (PH 267b), Co-instructor with Dr. SK Hammond. School of Public Health, University of California, Berkeley (alternative Spring semester)
2014-2018	**Exposure Assessment and Control II** (PH290.07), School of Public Health, University of California, Berkeley (alternative Spring semester)

PEER-REVIEWED PUBLICATIONS

1. **Liu S**, Yanu E, Turyk M, Kattau S, Rastiu A, Leeg J, Alajlounig M, Wallace c T, Catt c W, Aikinsu E. A pilot study characterizing tetrachloroethylene exposure with exhaled breath in an impacted community. Environmental Pollution. 297:118756, 2022. (Impact Factor = 8.071)

2. Tumlin K, **Liu S**, Park J. Framing Future of Work Considerations through Climate and Built Environment Assessment of Volunteer Work Practices in the United States Equine Assisted Services. International Journal of Environmental Research and Public Health. 18:10385, 2021. (Impact Factor = 3.390)

3. Shrestha D, Picciotto S, M LaValley, **Liu S**, Hammod S, D Weiner, Eisen E, Applebaum K. End-stage renal disease and metalworking fluid exposure. Occupational and Environmental Medicine. 0:1–8, 2021. (Impact Factor = 4.402)

4. James M Boiano, Sharon R Silver, Rebecca J Tsai, Wayne T Sanderson, **Sa Liu**, Lawrence W Whitehead. Development of Job Exposure Matrices to Estimate Occupational Exposure to Solar and Artificial Ultraviolet Radiation. A*nnals of Work Exposures and Health*, Volume 64, Issue 9, November 2020, Pages 936–943, https://doi.org/10.1093/annweh/wxaa076

5. Preston GW, Dagnino S, Ponzi E, Sozeri O, Veldhoven K, Barratt K, **Liu S**, Grigoryan H, Lu S, Rappaport SM, Chung KF, Cullinan P, Sinharay R, Kelly FJ, Chadeau-Hyam M, Vineis P, Phillips DH. Relationships between airborne pollutants, serum albumin adducts and short-term health outcomes in an experimental crossover study. *Chemosphere* 239 (2020) 124667. https://doi.org/10.1016/j.chemosphere.2019.124667

6. Neophytou AM, Costello S, Picciotto S, Noth EM, **Liu S**, Lutzker L, Balmes JR, Hammond SK, Cullen MR, Eisen EA. Accelerated lung function decline in an aluminum manufacturing industry cohort exposed to PM2.5: an application of the parametric g-formula. *BMJ Occupational and Environmental Medicine*. 2019. Online First. http://doi.org/10.1136/oemed-2019-105908

7. Bates MN, Pope K, So YT, **Liu S**, Eisen EA, Hammond SK. Hexane exposure and persistent peripheral neuropathy in automotive technicians. *Neurotoxicology*. 2019. 75:24–29. https://doi.org/10.1016/j.neuro.2019.08.008

8. Yao Y, Wang D, Ma H, Li C, Chang C, Low P, Hammond SK, Turyk ME, Wang J, **Liu S.** A pilot study of T-regulatory cell function in rural women exposed to polycyclic aromatic hydrocarbons (PAHs) in household air pollution in Gansu, China. *Environmental Research*. 2019. 173:306-317. https://doi.org/10.1016/j.envres.2019.03.053

9. Luo B, Shi H, Zhang K, Wei Q, Niu J, Wang J, Hammond SK, **Liu S**. Cold stress provokes lung injury in rats co-exposed to fine particulate matter and lipopolysaccharide. *Ecotoxicology and Environmental Safety*. 2019. 168:9–16. https://doi.org/10.1016/j.ecoenv.2018.10.064

10. Ye Zhonghui, Wang Juwei, Yao Yueli, Wang Dong, Ma Haitao, **Liu Sa**, Wang Junling. Study on Air Pollution Exposure Assessment of Lanzhou Residents from 2013 to 2017, *Journal of Environmental and Occupational Medicine*. 2018. 35(10):873-878. http://dx.doi.org/10.13213/j.cnki.jeom.2018.18263 (Chinese)

11. **Liu S**, Noth E, Eisen E, Cullen MR, Hammond SK. Respirator use and its impact on particulate matter exposure in aluminum manufacturing facilities. *Scandinavian Journal of Work, Environment & Health*. 2018. 44(5):547-554. https://doi.org/10.5271/sjweh.3735

12. **Liu, S**; Grigoryan, H; Edmands, W; Dagnino, S; Sinharay, R; Cullinan, P; Collins, P; Chung, KF; Barratt, B; Kelly, F; Vineis, P; Rappaport, SM. Cys34 adductomes differ between patients with chronic lung or heart disease and healthy controls in central London. *Environ Sci Technol*. 2018 52(4):2307-2313. https://doi.org/10.1021/acs.est.7b05554

13. Gou P, Chang X, Ye Z, Yao Y, SK Hammond, Wang J, **Liu S**. A pilot study comparing T-regulatory cell function among healthy children in different areas of Gansu, China. *Environ Sci Pollut Res*. 24(28):22579-22586, 2017. https://doi.org/10.1007/s11356-017-9907-3

14. Shrestha D, **Liu S**, Hammond SK, LaValley MP, Weiner DE, Eisen EA, Applebaum KM. Risk of renal cell carcinoma following exposure to metalworking fluids among autoworkers. *Occup Environ Med.* 73(10): 656–662, 2016. http://dx.doi.org/10.1136/oemed-2016-103769

15. Bates MN, Reed BR, **Liu S**, Eisen EA, Hammond SK. Solvent exposure and cognitive function in automotive technicians. *Neurotoxicology*. 57:22-30, 2016. https://doi.org/10.1016/j.neuro.2016.08.009

16. Beckman S, Eisen E, Bates MN., **Liu S**, Haegerstrom-Portnoy G, Hammond SK. Acquired Color Vision Defects and Hexane Exposure: A Study of San Francisco Bay Area Automotive Mechanics. *Am J Epidemiol*. 183(11):969-76, 2016. https://dx.doi.org/10.1093/aje/kwv328

17. Neophytou AM, Noth EM, **Liu S**, Costello S, Hammond SK, Cullen MR, Eisen EA. Ischemic Heart Disease Incidence in Relation to Fine versus Total Particulate Matter Exposure in a US Aluminum Industry Cohort. *PLOS ONE*. 2016. https://doi.org/10.1371/journal.pone.0156613

18. An FP, Bai JZ, Balantekin AB, Band HR, Beavis D, Beriguete W, … **Liu S**, et al. The detector system of the Daya Bay reactor antineutrino experiment. *Nuclear Instruments & Methods in Physics Research. Section A, Accelerators, Spectrometers, Detectors and Associated Equipment Vol*. 811: 1-51, 2015. https://doi.org/10.1016/j.nima.2015.11.144

19. **Liu S**, Gao P, Feng Y, Lin N, Lu B, Zhang Z, Xing B, Hammond SK. Concentrations of polycyclic aromatic hydrocarbons in resuspendable fraction of settled bus dust and its implications for human exposure. *Environ Pollut.* 198:1-7, 2015. https://doi.org/10.1016/j.envpol.2014.12.018

20. Gao P, **Liu S**, Ye W, Lin N, Meng P, Feng Y, Zhang Z, Cui F, Lu B, Xing B. Assessment on the occupational exposure of urban public bus drivers to bioaccessible trace metals through resuspended fraction of settled bus dust. *Sci Total Environ.* 508: 37–45, 2015. https://doi.org/10.1016/j.scitotenv.2014.11.067

21. Gao P, **Liu S**, Zhang Z, Meng P, Lin N, Lu B, Cui F, Feng Y, Xing B. Health impact of bioaccessible metal in lip cosmetics to female college students and career women, northeast of China. *Environ Pollut.* 197:214-20, 2015. https://doi.org/10.1016/j.envpol.2014.11.006

22. **Liu S**, Noth EM, Dixon-Ernst C, Eisen EA, Cullen MR, Hammond SK. Particle size distribution in aluminum manufacturing facilities. *Environment and Pollution.* 3(4):79-88, 2014. https://doi.org/10.5539/ep.v3n4p79

23. Noth EM, Dixon-Ernst C, **Liu S.**, Cantley L, Tessier-Sherman B, Eisen EA, Cullen MR, Hammond SK. Development of a job-exposure matrix for exposure to total and fine particulate matter in the aluminum industry. *J Expo Sci Environ Epidemiol.* 24(1):89-99, 2014. DOI: https://doi.org/10.1038/jes.2013.53

24. **Liu S**, Hammond SK, Rojas-Cheatham A. Concentrations and potential health risks of metals in lip products. *Environ Health Perspect.* 121(6):705-10, 2013. https://doi.org/10.1289/ehp.1205518

25. An FP, Bai JZ, Balantekin AB, Band HR, Beavis D, Beriguete W, … **Liu S**, et al. A side-by-side comparison of Daya Bay antineutrino detectors. *Nuclear Instruments & Methods in Physics Research. Section A, Accelerators, Spectrometers, Detectors and Associated Equipment* Vol. 685: 78 -97, 2012. https://doi.org/10.1016/j.nima.2012.05.030

26. An FP, Bai JZ, Balantekin AB, Band HR, Beavis D, Beriguete W, … **Liu S**, et al. Observation of electron-antineutrino disappearance at Daya Bay. *Phys. Rev. Lett.* 108, 171803, 2012. https://doi.org/10.1103/PhysRevLett.108.171803

27. **Liu S**, Hammond SK, Rappaport SM. Statistical modeling to determine sources of variability in exposures to welding Fumes. *The Annals of Occupational Hygiene*, 55 (3):305 -318, 2011. https://doi.org/10.1093/annhyg/meq088

28. **Liu S**, Hammond SK. Mapping particulate matter at the body weld department in an automobile assembly plant. *J Occup Environ Hyg*. 7(10):593-604. 2010. https://doi.org/10.1080/15459624.2010.509844

29. **Liu S**, Yang ZY, Liu Z, Chen SY. An initial study on treatment of domestic wastewater by anaerobic fast absorption process. China Water and Wastewater 15 (10): 13-16, 1999.

30. Yang ZY, **Liu S**, Chen SY. Study on two energy sources for anaerobic fast absorption of organics. China Water and Wastewater 14(10): 1-3, 1998.

31. Chen SX, **Liu S**. Sludge use and disposal in China, Tianjin. A Global Atlas of Wastewater Sludge and Biosolid Use and Disposal, IAWQ Science and Technical Report, No.4, 1996.

BOOK CHAPTERS

1. Hammond, SK and **Liu S**. Chapter 7: Gases, Vapors and Solvents, in *Fundamentals of Industrial Hygiene*, 6th Edition, BA Plog and PJ Quinlan, Editors, pp. 149-170, 2012.

CONFERENCE ABSTRACTS AND ORAL PRESENTATIONS

1. Rasti A, Yan E, Katta S, Aikins E, Neky S, Corcoran D, Wallace T, **Liu S**. PCE Exposure in Martinsville, Indiana. International Society for Exposure Science Annual Conference, September 21-22, 2020. Virtual Conference.

2. **Liu, S**; Ye, Zhonghui; Nguyen, Patton K.; Gou, Panhong; Chang, Xiaoru; Yao, Yueli; Wang, Dong; Luo, Bin; Low, Patrick; Hammond, S. Katharine; Wang, Junling. Polycyclic Aromatic Hydrocarbons and their Oxygenated Derivatives in a Typical Small City in Northwest China, A Pilot Study. Poster. International Society for Exposure Science - International Society for Environmental Epidemiology Joint Annual Meeting, August 26-30, 2018. Ottawa, Canada

3. **Liu, S**; Grigoryan, H; Edmands, W; Dagnino, S; Sinharay, R; Cullinan, P; Collins, P; Chung, KF; Barratt, B; Kelly, F; Vineis, P; Rappaport, SM. Cys34 Adductomes in the Oxford Street II Study. Chinese Society of Environmental Sciences Annual Conference of Environmental Medicine and Health Section. Guangzhou, China. November 2017.

4. Andreas Neophytou, Sadie Costello, Daniel Brown, Elizabeth Noth, **Sa Liu,** Katharine Hammond, Mark Cullen, Ellen Eisen. OCCUPATIONAL PM2.5 EXPOSURES AND PULMONARY FUNCTION DECLINE: AN APPLICATION OF THE PARAMETRIC G-FORMULA IN A US ALUMINIUM INDUSTRY COHORT. Occup Environ Med2017 74: A118. doi: 10.1136/oemed-2017-104636.311.

5. Zalay M, Hoang T, Blythe R, Raval A, **Liu S**, Hammond SK. Quantitative Investigation of Respirable Silica, Dust and Total Metals in a Ceramics Studio. American Industrial Hygiene Conference. Baltimore, MD. May 2016

6. Liao J, Parthasarathy S, Sklar R, Vinnikov D, Perrino C, Wang P, Kumagai K, **Liu S**, S. Hammond. Second-hand Exposure to Electronic Cigarette Smoke - a Pilot Field Sampling. International Society for Exposure Science. Henderson, NV. October 2015.

7. **Liu S**, Noth EM, Hammond SK. Respirator use and its impact on particulate matter exposure in aluminum manufacturing facilities. American Industrial Hygiene Conference. Salt Lake City, UT. May 2015.

8. **Liu S**, Hammond SK. Area samples: particle size in aluminum manufacturing facilities. Conference of Occupational Epidemiology. Chicago, IL. June 2014.

9. **Liu S**, Hammond SK. Area samples: particle size in aluminum manufacturing facilities. American Industrial Hygiene Conference. San Antonio, TX. May 2014.

10. **Liu S**, Hammond SK, Rojas-Cheatham A. Metals in lip products: concentrations and health risks. School of Public Health Symposium, University of California. Berkeley, CA. February 2014.

11. **Liu S**, Hammond SK. Particle size distribution in aluminum industry. American Industrial Hygiene Conference, Montreal, Canada. May 2013.

12. Horiuchi SS, Bates MN, Eisen EA, Tanner CM, So YT, Haegerstrom-Portnoy G, Reed BR, Windham GC, Fenster L, Lasley BL, **Liu S**, Hammond SK. Neurologic and reproductive effects of solvents on automotive repair workers. Occupational and Environmental Factors in Neurological Disease Occupational and Environmental Medicine Update. San Francisco, CA. October 2012.

13. **Liu S** and Rappaport SM. Mixed Models to Assess Exposures to Particulate Matter and Manganese during Welding. International Society of Exposure Science-International Society of Environmental Epidemiology Joint Meeting. Seoul, Korea. August, 2010.

14. **Liu S**, Hammond SK. Characterization of Manganese Exposure in Welding Processes. American Industrial Hygiene Conference, Toronto, Canada. May 2009.

15. **Liu S**, Hammond SK. Mapping Particulate Matter in a Body Weld Department in an Automotive Assembly Plant. Best in Session Award. American Industrial Hygiene Conference, Philadelphia, PA. June 2007.

HONORS AND AWARDS

2021	Landolt Teaching Award School of Health Sciences, Purdue University
2021	Student Service Learning Summit 1st Place Prize, faculty mentor, Purdue University
2020	Mini Student Service Learning Award, faculty mentor, Purdue University
2020	Robert Wood Johnson Foundation Interdisciplinary Research Leaders Cohort 5
2016	Teaching Excellence Award, School of Public Health, University of California, Berkeley
2014	Teaching Excellence Award, School of Public Health, University of California, Berkeley

Ad hoc reviewer for peer-reviewed journals:

Brain Science
American Journal of Respiratory and Critical Care Medicine
Annals of Work Exposures and Health
Journal of Occupational and Environmental Hygiene
Environmental Science: Processes & Impacts,
Environmental Science and Pollution Research
Journal of Exposure Science and Environmental Epidemiology

CURRENT RESEARCH SUPPORT

1. **Robert Wood Johnson Foundation Interdisciplinary Research Leaders**
   Liu (PI)   9/15/2020 – 9/14/2023
   Groundwater Contamination and Health Equity in a Deindustrialized Midwestern Community
   Taking community engaged research approach to investigate residents' exposure to groundwater contamination through drinking/using water from private wells and related environmental health disparities.

2. **Showalter Foundation Research Trust**   Liu (PI)   7/1/2020 – 7/31/2021
   Tetrachloroethylene (PCE) contamination and children's health in Martinsville, IN
   To characterize tetrachloroethylene (PCE) exposure among children living in Martinsville, IN; and determine neurodevelopmental effects of long-term, low level exposure to PCE among children

3. **NIH/NIEHS RO1 ES032478-01**   Dydak (PI)   09/01/2020 – 8/31/2025
   Neuroimaging of Manganese Toxicity
   To describe Manganese (Mn) deposition and elimination in the human brain and to assess whether it leads to brain region-specific symptoms via oxidative stress and neurotransmitter imbalance.
   Role: Co-I

4. **NIH/NIEHS R25-ES033045**   Wells (PI)   09/22/2021 – 8/31/2026
   Distance Education and Training on Emerging Contaminants and Technologies
   Role: Co-I

5. **CDC/NIOSH T03-OH008615**   Wells (PI)   07/01/2017 – 6/30/2022
   Distance Education and Training on Emerging Contaminants and Technologies
   Role: Co-I

6. **Indiana Clinical and Translational Sciences Institute** Wells (PI)   10/01/2021 – 9/30/2023

Rural Environmental Health Assessment and Neighborhood-Specific Public Health Plan for Hartford City Using a Community-Engaged Approach

Role: Co-I

7. **Purdue Institute for Integrative Neuroscience (PIIN) Grand Challenges**
                                                                Cannon (PI)   10/15/19 – 10/14/2020 NCE

Elucidation of the environmental and genetic risk factors that underlie the pathogenesis of Parkinson's disease subtypes in Indiana

to test our overarching hypothesis: PD patients presenting with different PD subtypes arise in part due to genetically- or epigenetically-mediated perturbations of molecular networks that modulate individual responses and vulnerability to prevalent environmental risk factors.

Role: Co-I

COMPLETED RESEARCH SUPPORT

CDC/NIOSH - Occupational Safety and Health Training Grant   Wells (PI)   1/1/2017 – 12/31/2021

Goals: To prepare its graduates to be professionals, leaders and researchers in Industrial Hygiene and related fields.

Role: Co-I

Purdue Instrument Grant   Wells/Park/Liu (M-PI) 2/1/2021 – 5/16/2021

A field-portable x-ray fluorescence (FP-XRF) instrument would enhance active learning in Occupational and Environmental Health Sciences (OEHS) courses and student research.

Purdue Student Service-Learning Grant   Elizabeth Ann Aikins   10/1/2020-5/16/2021

Working with community partners, undergraduate students in health sciences will interact with community members to teach community members including high school students about collecting environmental and biological samples related to community exposure to environmental contamination of volatile organic compounds in groundwater, soil and indoor air.

Role: Faculty advisor

Centre for Research on Multinational Corporations   Liu (PI)   2/1/2019 – 12/31/2020

Urinary Metabolites of Solvent Exposure among Workers in Electronic Factories in Batam, Indonesia

(funded via European Union Centre for Research on Multinational Corporations)

To detect levels of solvent metabolites in urine samples among workers and determine, 1) whether urine metabolites can be used as biomarkers of exposure in this population of workers; and 2) estimates of exposure levels of these workers.

NSF China - Oversea Collaboration Grant   Liu (PI)   1/1/2019 – 12/31/2020

Impact of Indoor Air Pollution from Winter Heating on Blood Pressure of Rural Villagers in Northern China

A pilot project to investigate the association between household air pollution and blood pressure among pre-hypertension adults in rural northwestern China. Evaluate the impact of winter peak air pollution exposure on the hypertension status.

International Manganese Institute   Dydak (PI)   9/1/2018 – 6/30//2020

Can Toenail Mn levels predict Brain Mn levels?

To test the hypothesis that toe nail Mn levels may be predictive of brain Mn levels, and eventually be used as a marker for personal exposure and risk assessment.

Role: Co-I

NIOSH/ERC Pilot Grant, Cincinnati University Tumlin (PI) 7/1/19 – 6/3/2020
<u>Assessing volunteer workers' exposure to dust, metals and bioaerosol during equine assisted activities/therapies: an exploratory study</u>
Goals: To obtain preliminary data on work practice in equine assisted activities/therapies facilities and to perform an initial evaluation on volunteer workers' exposure to dust and its constituents during these activities.
Role: Co-I

NIOSH/ERC Pilot Grant, University of Michigan Park (PI) 7/1/19 – 6/3/2020
<u>Nano Particulates in Welding Fumes and Manganese Deposition in the Human Brain: Does Size Matter?</u>
Goals: To test if the exposure to nano-Mn in welding fumes is better correlated with Mn deposited in the brain than exposure to resp-Mn.
Role: Co-I

Developing World Outreach Initiative (DWOI) Technical Grant Liu (PI) 11/01/2018 – 10/31/2019
<u>Urinary Metabolites of Metal Exposure among Workers in Electronic Factories in Batam, Indonesia</u>
(funded via of the Northern California Section of the American Industrial Hygiene Association & Maquiladora Health & Safety Support Network)
To detect levels of metals in urine samples among workers and determine the level of exposure among these workers.

Chau Hoi Shuen Foundation Hammond (PI) 3/16/2017–12/31/2018
<u>Exposure to Indoor Air Pollutants and Associated Immunological Effects on Rural Chinese Women</u>
To study immune response to peak indoor air pollution of rural Chinese women during heating season, when coal and biomass are burned intensively indoors with limited ventilation. The study design will provide us a unique opportunity to explore changes of immune functions induced by high pollution concentrations, as well as different composition of polycyclic aromatic hydrocarbons (PAHs), beyond what is possible in the U.S.
Role: Lead Investigator

Chau Hoi Shuen Foundation Hammond (PI) 1/1/2015 – 12/31/2016
<u>Health Effects of Air Pollution on Children in Lanzhou, China</u>
The goal is to perform a preliminary investigation of the association between air pollution exposure and childhood immunological impairments.
Role: Lead Investigator

NIOSH T42 OH008429 Balmes (PI) 7/01/2011 – 6/30/2020
<u>Occupational Safety and Health Education and Research Centers</u>
The major goal of this project is to provide training in occupational epidemiology.
Role: Assistant Director of Industrial Hygiene Program

NIH NIEHS P42ES004705-28S1 Smith (PI) 8/8/2017 – 8/7/2022
<u>Toxic Substances in the Environment</u>
The overall theme of the Berkeley Superfund Research Program (SRP) is using state-of-the-art technology, including 'omics' and nanotechnology, to (1) develop biological markers and apply them in human population studies, especially those involving susceptible populations such as children and pregnant women; (2) to improve chemical detection; and, (3) facilitate and lower the cost of waste site remediation.
Role: Researcher, under supervision of Dr. S.M.Rappaport (Project 4)
(No longer involved in this project as of August 13, 2018 due to change of institution)

NIOSH R01 OH009939 06 Cullen (PI) 9/1/2016 – 8/31/2020
<u>OCCUPATIONAL EXPOSURE TO PM2.5 AND CARDIOVASCULAR DISEASE(CVD)</u>

We propose to examine CVD incidence and mortality in a large cohort of variably exposed manufacturing workers, with following hypotheses: 1) Exposure to occupational PM2.5 increases risk of CVD incidence and subsequent mortality as a function of dose, after accounting for other risk factors; 2) Particles containing PAHs and/or other radical species confer greater risk than chemically inert particles; 3) Occupational exposures will cause risks intermediate between air pollution and active smoking; 4) There will be an interaction between workplace exposure to PM2.5 and smoking such that non-smokers will be disproportionately affected, and; and 5) Women may also be at disproportionately higher risk than men exposed to similar concentrations of PM2.5.
Role: Co-I