Shu-An Lee(李書安)

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Education

Period	Degree	University	Discipline
09/00~08/04	Doctor	University of Cincinnati, Cincinnati, USA	Industrial Hygiene
08/95~06/97	Master	Tsing-Hua University, Hsinchu, Taiwan	Environmental Science
08/91~06/95	Bachelor	Taipei Medical College, Taipei, Taiwan	Public Health

Current position

08/09~ Present: Associate Professor in the Department of Environmental Engineering and Science of Feng Chia University, Taichung, Taiwan, R.O.C.

Summary of research and other professional experiences

2010 "Performance Evaluation of Half Filtering Facepiece Respirators" funded by the Institute of Occupational Safety and Health. (Principle Investigator)

2009~2011 "Factors influencing nanopowder release" funded by the National Science Council (NSC-98-2221-E-035-009-MY2). (Principle Investigator)

2008~2009 "Expansion of the Residential Comfort Information System for Taichung City" funded by the Environment Protection Bureau of Taichung City. (Principle Investigator)

2008~2009 "Use of (1-3)-β-D-Glucan as a surrogate to evaluate the protection provided by N95 facepiece respirators against molds in agricultural farms" funded by the National Science Council (NSC-97-2221-E-035-037). (Principle Investigator)

2008 "Control and measurement of particles during the nanopowder bagging process" funded by the Institute of Occupational Safety and Health. (Principle Investigator)

2007~2008 "Use of (1-3)-β-D-Glucan as a surrogate to evaluate the protection provided by N95 facepiece respirators against molds in agricultural farms" funded by the National

Science Council (NSC-96-2221-E-035-016). (Principle Investigator)

2007~2008 "Career Program: Occupational Safety and Hygiene" funded by the Bureau of Employment and Vocational Training, Council of Labor Affairs, Executive Yuan. (Principle Investigator)

2007~2008 "Establishment of the Environmental Comfort Information Inquiry System for Nantou County" funded by the Environment Protection Bureau of Nantou County. (Co-principle Investigator)

2007 "Establishment of the Residential Comfort Information System for Taichung City" funded by the Environment Protection Bureau of Taichung City. (Principle Investigator)

2006~2007 **"**The study of O_3, NOx, CO, CO_2, and fine particles generated by commercialized air cleaning devices" funded by the Research Program of Feng Chia University. (Principle Investigator)

2004~2005 Involved in a 5-year epidemiological study entitled **"**Cincinnati Childhood Allergy and Air Pollution Study" funded by the National Institute of Environmental Health Sciences for designing sampling strategies of collecting outdoor and indoor diesel, PM2.5, and allergens (pollen, and fungi).

2004~2005 Developed a metal working fluid simulator for the study of "Microbial Air Contamination from Machining Fluids " funded by the National Institute of Occupational Safety and Health (NIOSH) and involved in the field sampling and analyses.

2003~2004 "Respiratory Protection Against Viruses: The Protection Provided by Respirators Against SARS-Causing Corona Virus Simulated by Non-Biological Particles" supported by the National Institute of Occupational Safety and Health (NIOSH) Pilot Project Research Training Program of the University of Cincinnati Education and Research Center. (Principle Investigator)

2003 "Evaluation of the Workplace Protection Factors (WPFs) of N95 Facepiece Respirators Against Fungal Spores Using Non-biological Particles as Simulants" supported by the National Institute of Occupational Safety and Health (NIOSH) Pilot Project Research Training Program of the University of Cincinnati Education and Research Center.

(Principle Investigator)

2002~2004 "Respiratory Protection Against Bioaersols in Agriculture" funded by NIOSH. Data collected were published in my dissertation and papers.

2001~2002 "Collection of Charged Microorganisms by Electrostatic Means" funded by NIOSH. Apply the newly designed Electrostatic Precipitator for collecting microorganisms in both laboratory and field studies.

1998~2000 Involved in "Remediation and Consolidation of Dann-Shui River in Taiwan" funded by EPA, Taiwan. Besides field sampling, chemical analyses and data analyses were also conducted.

1996~1997 "Monitoring Specific Odors and VOCs in Semiconductor Factories" funded by Demos Technology Inc..

1995~1997 "Simultaneous Determination of VOCs in Urine by Thermal Desorption-Gas Chromatography" ~ master thesis.

1995~1996 "Nathphthalene – a Biomarker of the Exposure to PAHs" funded by National Scientific Council, Taiwan.

1994~1995 "Causes of High Blood Pressure in Aged Population".

1994~1995 "Case study of Bladder Cancer in Dye Manufacturing Plants".

1994 **"**Analyses of Arsenic Species in Urine by HPLC/AA for the residents in the Black Foot Area" ~ special topic.

1993~1995 "The Dependence of the Black Foot Disease on Arsenic Species in the Southwest Coastal Area in Taiwan".

1993 "A Study on the Nursing and Caring of the Aged People in Taiwan"**.**

Working experience

2005~2009 Assistant Professor in the Department of Environmental Engineering and Science, Feng Chia University, Taiwan.

2004~2005 Postdoctoral Fellow at the Center for Health-Related Aerosol Studies in the

Department of Environmental Health of University of Cincinnati.

2000~2004 Graduate Assistant at the Center for Health-Related Aerosol Studies in the Department of Environmental Health of University of Cincinnati.

1998~2000 Assistant Researcher in the National Institute of Environmental Analysis, Environmental Protection Agency (EPA), Taiwan.

On-the-job-training

2007 "2-Day Workshop for Negative Pressure Isolation Room (Basic and Advanced)", the Institute of Occupational Safety and Health, Council of Labor Affairs, Executive Yuan, Taiwan.

2005 "2-Week Workshop for Industrial Hygiene and Safety", Lab Safety and Hygiene, Ministry of Education, Executive Yuan, Taiwan.

2003 "Respiratory Protection and Fit Testing Workshop" conducted by Dr. Roy Mckay, University of Cincinnati, USA.

1998~2000 "Homepage Design", "Word", "Excel", "Power Point", "Access", "Simple Maintenance and Installation of Computer Hardware and Software", NIEA, EPA, Taiwan.

1999 "Sampling Skills in Superfund Site and Waste Site", NIEA, EPA, Taiwan.

1998 "Development of Second Professional Skill of Semiconductor Techniques", National Youth Commission, Executive Yuan, Taiwan.

Techniques skills in research field studies

1. Operation of different aerosol sampling devices: a) Burkard personal slide sampler, b) Andersen Two and Six Stage Sampler, c) Biosampler, d) Button Personal Inhalable Sampler, e) Grimm Optical Particle Counter, f) Hand Held Particle Counter (HHPC-6), g) Electrostatic Precipitator Sampler, h) TSI Portacount plus Model 8020, i) P-Trak Ultrafine Particle Counter, j) DustTrak Photometer, k) Electrical Low Pressure Impactor (ELPI 3935 series, TSI Inc.), and l) Wide-Range Particle Spectrometer (Model 1000XP, MSP Corp.).

2. Aerosolization of bacteria and fungi using Collison Nebulizers, cyclonic vacuum cleaner, agar surface disperser, and other methods.

3. Operation of different instruments in chemical analyses: HPLC, GC, GC/MS, ATD, Purge and Trap, AA, etc.

4. Organic pollutant analysis, trace element analysis, and air pollutant analysis.

5. Data Analysis: Excel, SPSS, SAS, and Sigma Plot.

6. Microsoft Office: Microsoft Word, Excel, Power Point, and Outlook.

Certificate/Training program/Awards

2010 John M. White Respiratory Protection Award, American Industrial Hygiene Association.

2009 Award for Excellence in the 2008/2009 Academic Year Student Thesis Competition of College of Sciences, Feng Chia University, in June, 2009.

2006 John M. White Respiratory Protection Award, American Industrial Hygiene Association.

2005 Kudo award on the respirator research, University of Cincinnati, Cincinnati, Ohio, USA, in August, 2005.

2003 Completed the "HIPAA (Health Insurance Portability and Accountability Act) Privacy Introduction" online courses sponsored by the University of Cincinnati, Cincinnati, Ohio, USA, on 10th April, 2003.

2003 Completed the "Human Participants Protection Education for Research Teams" online courses, sponsored by the National Institutes of Health (NIH), Bethesda, Maryland, USA, on 10th April, 2003.

2002 Brent Edwards, Jim Reeb, Nancy Burton and Shu-An Lee, as a group, were congratulated by the chair of the ASSE Foundation on the decision by the Foundation to use the group's idea entitled, "Analysis of Workplace Fatalities and Injuries from Material Handling in Retail Trade Home Improvement and Club Warehouse Industries". It will be submitted to NIOSH for possible future research.

2000~2003 UGS scholarship awarded by University of Cincinnati.

1997 National Certification of Governmental Official Position, Taiwan.

Extracurricular activities

I have been elected to be a class leader, and a treasurer many times throughout my student career.

2000~2001: President of Taiwanese Student Association in University of Cincinnati

Publications

Publications in peer-reviewed internationally circulated journals:

1. Grinshpun, S.A., H. Harruta, Eninger R.M., T. Reponen, R. McKay, and **S.A. Lee**. Performance of an N95 filtering facepiece particulate respirator and a surgical mask during human breathing: Two pathways for particle penetration. *J. Occup. Environ. Hyg. 6*: 593-603 (2009).

2. Yang, H.H., **S.A. Lee**, D.P.H. Hsieh, M.R. Chao, and C.H. Tung. PM2.5 and associated polycyclic aromatic hydrocarbon and mutagenicity emissions from motorcycles. *Bull. Environ. Contam. Toxicol. 81*: 412-415 (2008).

3. **Lee, S.A.**, S.A. Grinshpun, and T. Reponen. Respiratory performance offered by N95 respirators and surgical masks: Human subject evaluation with NaCl aerosol representing bacterial and viral particle size range. *Ann. Occup. Hyg.* 3: 1-9 (2008)

4. Wang,H., T. Reponen, **S.A. Lee**, E.M. White, and S.A. Grinshpun: Size distribution of airborne mist and endotoxin-containing particles in metalworking fluid environments. *J. Occup. Environ. Hyg.* 4*(4)*:157-165 (2007)

5. **Lee, S.A.**, A. Adhikari, S.A. Grinshpun, R. McKay, R. Shukla, and T. Reponen: Comments on a recent protection factor study - The authors reply. *J. Occup. Environ. Hyg. 3(7)*:D68-D70 (2006).

6. **Lee, S.A.**, A. Adhikari, S.A. Grinshpun, R. McKay, R. Shukla, and T. Reponen: Personal exposure to airborne dust and microorganisms in agricultural environments. *J. Occup. Environ. Hyg. 3*:1-13 (2006).

7. **Lee, S.A.**, A. Adhikari, S.A. Grinshpun, R. McKay, R. Shukla, and T. Reponen: Respiratory protection provided by N95 filtering facepiece respirators against airborne dust and microorganisms in agricultural farms. *J. Occup. Environ. Hyg. 2*:577-585 (2005).

8. **Lee, S.A.**, S.A. Grinshpun, A. Adhikari, W. Li., R. McKay, and T. Reponen: Laboratory and field evaluation of a new personal sampling system for assessing the protection of the N95 filtering-facepiece respirators against particles. *Ann. Occup. Hyg. 49(3)*: 245-57 (2005).

9. Adhikari, A., T. Reponen, **S.A. Lee**, and S.A. Grinshpun: Assessment of human exposure to airborne fungi in agricultural confinements: personal inhalable sampling versus stationary sampling. *Ann. Agric. Environ. Med. 11*: 269-277 (2004).

10. **Lee, S.A.**, T. Reponen, W. Li, M.A. Trunov, K. Willeke, and S.A. Grinshpun: Development of a new method for measuring the protection provided by respirators against dust and

microorganisms. *Aerosol and Air Quality Research 4*: 56-73 (2004).

11. **Lee, S.A.**, K. Willeke, G. Mainelis, A. Adhikari, H. Wang, T. Reponen and S. Grinshpun: Assessment of electrical charge on airborne microorganisms by a new bioaerosol sampling method. *J. Occup. Environ. Hyg. 1*:127-138 (2004).

12. Mainelis, G.; A. Adhikari, K. Willeke, **S.A. Lee**, T. Reponen, and S.A. Grinshpun: Collection of airborne microorganisms by a new electrostatic precipitator. *J. Aerosol Sci. 33*:1417-32 (2002).

13. Hung, I-Fu, **S.A. Lee**, and R.K. Chen: Determination of naphthalene in urine by purge-and-trap gas chromatography. *Polycyclic Aromatic Compounds 17*: 179-185 (1999).

14. **Lee, S.A.**: "Analysis Method for the Carbamate Insecticides from Toxicity Characteristic Leaching Procedure (12 Carbamates)". *Periodical of NIEA 28*:24-30, (1999).

15. Hung, I-Fu, **S.A. Lee**, and R.K. Chen: Simultaneous determination of benzene, toluene, ethylbenzene, and xylenes in urine by thermal desorption–gas chromatography. *Journal of Chromatography B: Biomedical Sciences and Applications 706*: 352-357 (1998).

Conference abstracts and posters:

1. **Lee, S.A.**, and Y.K. Wang. The effect of aerosolized method and cultivation time on fungal release in the air. International Aerosol Conference, Helsinki, Finland, on Aug. 29 - Sep 3, 2010.

2. **Lee, S.A.**, W.H. Ko, C.H. Liao, C.W. Chen, and C.J. Tsai. Control of fugitive particles released in the air during the nano powder bagging process. American Industrial Hygiene Conference and Exposition, Denver, USA, on May 22-27, 2010.

3. Reponen, T., **S.A. Lee**, Grinshpun, S.A., E. Johnson, and R. McKay. Effect of fit-testing and particle size on the protection offered by N95 filtering facepiece respirators against fine particles in a laboratory setting. American Industrial Hygiene Conference and Exposition, Denver, USA, on May 22-27, 2010.

4. Grinshpun, S.A., H. Haruta, R. McKay, R. M. Eninger, T. Reponen, and **S.A. Lee**. Pathways for particle penetration through a filtering facepiece particulate respirator during human breathing. American Industrial Hygiene Conference and Exposition, Toronto, Canada, on May 30 - June 4, 2009.

5. **Lee, S.A.**, W.H. Ko, C.H. Liao, C.W. Chen, and C.J. Tsai. Use of an auger-type filling apparatus to investigate the airborne characteristics of Al_2O_3 nano powders in the bagging process. International Conference of Industrial Hygiene and Occupational Medicine, Taichung, Taiwan, on April 25-26, 2009.

6. **Lee, S.A.**, Bo-Yu Chen, and Hongxia Wang. 2007. Size distribution of endotoxin and bacteria in metalworking fluid environments. 2007 International Conference of Industrial Hygiene and Occupational Medicine, Kaohsiung, Taiwan, on April 28-29.

7. **Lee, S.A.**, and T. Reponen. 2006. The effect of the faceseal leakage created by N95 filtering facepiece respirators on the measurement of fit testing. 2006 International Conference of Industrial Hygiene and Occupational Medicine, Taipei, Taiwan, on April 28-29.

8. Reponen, T., **S.A. Lee**, R. McKay, R. Shukla, S.A. Grinshpun. 2006. Respiratory Protection against Bioaerosols in Agriculture. Submitted to NIOSH NORA Symposium 2006, Washington, DC, on April 18-20, 2006.

9. Grinshpun S.A., M. Toivola, **S.A. Lee**, T. Reponen. 2005. Formation of nanoparticles in indoor air at an increased ozone level. 24rd Annual American Association for Aerosol Research Conference, Austin, Texas, USA.

10. **Lee, S.A.**, T. Reponen, S.A. Grinshpun. 2005. Efficiency of N95 filtering facepiece respirators and surgical masks against airborne particles of viral size range: tests with human subjects. American Industrial Hygiene Conference and Exposition, Anaheim, CA, USA.

11. **Lee, S.A.**, T. Reponen, and S.A. Grinshpun. 2004. Respiratory protection against viruses: the protection provided by respirators against SARS-causing corona virus simulated by non-biological particles. 5th Annual Symposium of the National Institute for Occupational Safety and Health supported Education and Research Center Pilot Research Project, University of Cincinnati, Cincinnati, Ohio, USA.

12. **Lee, S.A.**, A. Adhikari, S.A. Grinshpun, and T. Reponen. 2004. A new method to evaluate respiratory protection provided by N95 respirators against airborne dust and microorganisms in agricultural farms. 23rd Annual American Association for Aerosol Research Conference, Atlanta, Georgia, USA.

13. Reponen, T., **S.A. Lee**, A. Adhikari, R. McKay, S.A. Grinshpun. 2004. Evaluation of a new method for assessing the efficiency of respirators against fungal spores in agricultural workplaces. American Industrial Hygiene Conference and Exposition, Atlanta, Georgia, USA.

14. **Lee, S.A.**, A. Adhikari, S.A. Grinshpun, K. Willeke, R. McKay, R. Shukla, A. Maynard, and T. Reponen. 2003. Evaluation of the workplace protection factors (WPFs) of N95 facepiece respirators against fungal spores using non-biological particles as simulants. 4th Annual Symposium of the National Institute for Occupational Safety and Health supported Education and Research Center Pilot Research Project, University of Cincinnati, Cincinnati, Ohio, USA.

15. Adhikari, A., T. Reponen, **S.A. Lee**, and S.A. Grinshpun. 2003. Personal exposure of farmers to airborne pollen and fungal spores during different agricultural acitivities. 4th Annual Symposium of the National Institute for Occupational Safety and Health supported Education and Research Center Pilot Research Project, University of Cincinnati, Cincinnati, Ohio, USA.

16. **Lee, S.A.**, T. Reponen, W. Li, K. Willeke, and S.A. Grinshpun. Development of a Personal Sampling System for Assessing the Efficiency of Respirators Against Fungal Spores. 2003. American Industrial Hygiene Conference and Exposition, Dallas, Texas, USA.

17. **Lee, S.A.**, T. Reponen, and S.A. Grinshpun. 2003. Respiratory protection against viruses: the protection provided by respirators against SARS-causing corona virus simulated by non-biological particles. 4th Annual Symposium of the National Institute for Occupational Safety and Health supported Education and Research Center Pilot Reserch Project, University of Cincinnati, Cincinnati, Ohio, USA.

18. Wang, H.X., T. Reponen, D. Martuzevicius, W. Li, **S.A. Lee**, S.A. Grinshpun, and K. Willeke. 2003. Increase of fine particle aerosolization resulting from microbial contamination of metal

working fluids. American Industrial Hygiene Conference and Exposition, Dallas, Texas, USA.

19. Willeke, K., **S.A. Lee**, A. Adhikari, T. Reponen, S.A. Grinshpun, S. Cho, and H. Wang. 2002. New low-power method for bioaerosol collection by electrostatic means. 7th International Congress on Aerobiology, Montebello, Montreal, Canada.

20. Adhikari, A., S.H. Cho, P. Pal, H. Wang, **S.A. Lee**, A. Kelley, H.G. St. Clair, G. LeMasters, S.A. Grinshpun, and T. Reponen. 2002. Evaluation of the Button sampler for the measurement of outdoor aeroallergens. 7th International Conference on Aerobiology, Montebello, Montreal, Canada.

21. Mainelis, G., K. Willeke, A. Adhikari, **S.A. Lee**, S.A. Grinshpun, and T. Reponen. 2002. Design and performance of a new electrostatic precipitator for bioaerosol collection. 21st Annual American Association for Aerosol Research Conference, Charlotte, North Carolina, USA.

22. Willeke, K., G. Mainelis, A. Adhikari, T. Reponen, S.A. Grinshpun, **S.A. Lee**, and S. Cho. 2002. Bioaerosol collection by a new electrostatic precipitator. American Industrial Hygiene Conference and Exposition, San Diego, California, USA.

23. Hung, I.F., **S.A. Lee**, and R.K. Chen. 1997. Determination of naphthalene in urine by purge and trap gas chromatography. 16th International Symposium on Polycyclic Aromatic Compounds, Charlotte, NC, USA, on November 4-8, 1997.

24. 沈健智，陳仁焜，楊立民，**李書安**，洪益夫，主動式與被動式採樣分析 VOCs 化合物之研究，1996 作業環境測定技術研討會，台北，台灣，11 月 26-27 日，1996。

Full papers in proceedings:

1. Wang, Y.K., and **S.A. Lee**. Use of aerosolization apparatus on investigation of biological characteristics of airborne fungi. 2009 International Conference of Industrial Hygiene and Occupational Medicine, Taichung, Taiwan, on April 25-26, 2009.

2. **Lee, S.A.**, B.Y. Chen, Y.K. Wang, K.H. Chiang, and D.C. Hwang. Formation of indoor secondary organic aerosols through reaction between ozone and essential oils. 15th International Conference on Aerosol Science and Technology, Taipei, Taiwan, on September 26th ~ September 27th, 2008.

3. **Lee, S.A.**, and Bo-Yu Chen. 2008. Cleaning efficiency and by-product generation of air cleaning devices. In: *Proceedings of the 11th International Conference on Indoor Air Quality and Climate*. Copenhagen, Denmark, on August 17th to August 22nd, 2008.

4. Chen, B.Y., **S.A. Lee**, Y.K. Wang, D.C. Hwang, and J.J. Liang. 2007. Investigation on by-product generation of air cleaning devices. In: *Proceedings of the 19th Chinese Environmental Engineering Conference*. Kaohsiung, Taiwan, on Nov. 23~ Nov. 24, 2007.

5. Lee, L.D., Y.Y Pai, S.C. Yen, **S.A. Lee**, S.L. Kung, and C.C. Wu. 2007. Establishment of Air quality and residential comfort information system for Taichung City. In: *Proceedings of the 19th Chinese Environmental Engineering Conference*. Kaohsiung, Taiwan, on Nov. 23~ Nov. 24, 2007.

6. **Lee, S.A.**, S.L. Kung, C.C. Wu, and S.W. Hsiao. 2007. A model developed for assessing residential comfort of Taichung city. In: *Proceedings of the International Conference on Sustainable Building 2007 Taipei*. pp. F06-1~F06-6. Taipei, on Nov 9th ~ Nov 11th, 2007.

7. **Lee, S.A.**, B.Y. Chen, and G..Z. Su. 2007. Investigation on the levels of O_3, NO_x, CO, CO_2 and fine particles during operation of air cleaning devices in indoor environments. In: *Proceedings of the International Conference on Sustainable Building 2007 Taipei*. pp. A09-1~A09-8. Taipei, Taiwan, on Nov 9th ~ Nov 11th, 2007.

8. **Lee, S.A.**, and H.X. Hong. 2007. Bacterial contamination in metal working fluid environments. 11th Mainland-Taiwan Environmental Protection Academic Conference, Harbin, Mainland China, on June 8th ~ June 10th, 2007.

9. **Lee, S.A.**, and T. Reponen. 2005. Protection provided by N95 filtering facepiece respirators and surgical masks against airborne particles in bacterial and viral size ranges. 12th International Conference on Aerosol Science and Technology, Taipei, Taiwan, on September 30th ~ October 1st, 2005.

10. Grinshpun S.A., M. Toivola, **S.A. Lee**, T. Reponen. Ozone generation as an indoor air cleaning method: does it actually reduce the aerosol concentration level? In*: Proceedings of the Fourth Asian Aerosol Conference*. Numbai, India (2005).

11. Willeke, K., G. Mainalis, A. Adhikari, S.A. Grinshpun, T. Reponen, **S.A. Lee** and S.H. Cho. 2002. Airborne microorganism collection by a new electrostatic precipitator. In*: Proceedings of Indoor Air Conference*. pp. 396- 401. Monterey, California, USA(2002).

12. **Lee, S.A.**, K. Willeke, G. Mainelis, A. Adhikari, T. Reponen, S.A. Grinshpun, S.K. Sivasubramani, R.L. Gorny, and R. Shukla. 2002. New method for collecting airborne microorganisms by electrostatic precipitation. In: *Proceedings of the Sixth International Aerosol Conference*, vol. 2 , pp. 767-768, Taipei, Taiwan (2002).

13. **Lee, S.A.**, L.M. Yang, and I.F. Hung. 1997. Analyses of Naphthalene in Urine, Symposium on Industrial Hygiene and Occupational Health, p. 80-82, Kaohsiung, Taiwan, R.O.C., April 6-8, 1997.

Technical reports and other publications:

1. 洪益夫，陳正芳，**李書安**，陳仁焜，尿液中奈及其代謝物之分析研究，行政院國科會，1997。(國科會計畫編號:NSC-86-2113-M-007-051)

2. 洪益夫，陳正芳，**李書安**，奈-多環芳香烴之暴露指標物，行政院國科會，1996。(國科會計畫編號:NSC-85-2113-M-007-042)

Professional members and reviews

1. Member of American Industrial Hygiene Association, 2010~present.
2. Member of International Institute of Sustainable Building and Environment, 2008~present.
3. NIEA field expert on evaluating company performance for pollutant analysis, 2007~present.
4. Member of the Chinese Association for Indoor Air Quality in Taiwan, 2006~present.
5. Member of the Chinese Association for Aerosol Research in Taiwan, 2005~present.
6. Peer reviewer for Aerosol and Air Quality Research, 2005~present.

Major presentations

2010 -Invited presentation, Archilfe Research Foundation, Taipei, Taiwan.

2009 -Invited presentation, Department of Occupational Safety and Health, Chung Hua University of Medical Technology, Hsinchu, Taiwan.

2007 -Invited presentation, Department of Biomedical Engineering and Environmental Sciences, National Tsing Hua University, Hsinchu, Taiwan.
-Invited presentation, Archilfe Research Foundation, Taipei, Taiwan.

2006 -Invited presentation, Institute of Environmental Health, National Taiwan University, Taipei, Taiwan.

2005 -Invited presentation, Archilfe Research Foundation, Taipei, Taiwan.
-Invited presentation, Department of Environmental Engineering and Science, Fen Chia University, Taichung, Taiwan.

Teaching experience

2009 ~present Associate Professor in the Department of Environmental Engineering and Science of Feng Chia University, Taichung, Taiwan, R.O.C..

2005~2009 Assistant Professor in the Department of Environmental Engineering and Science of Feng Chia University, Taichung, Taiwan, R.O.C..

2002~2004 Teaching Assistant in the class of Practice in Occupational Exposure Assessment I & II. at the Department of Environmental Health of the University of Cincinnati.

2003 Teaching Assistant in the Respiratory Protection and Fit Testing Workshop at University of Cincinnati.

List of courses taught in the past

1. General Chemistry
2. Personal Protective Equipment
3. Prevention of Fire and Explosion
4. Machinery and Electrical Protection
5. Environmental Pollution
6. Environmental Management System (ISO 14000)
7. Indoor Air Quality
8. Environmental and Hygienic Pesticides
9. Fundamentals of Dust Removal

Research interest

1. Indoor air quality
2. Investigate PPE performance against chemicals, and microorganisms
3. Exposure assessment to allergens, aerosols, bioaerosols, and chemicals
4. Evaluation of respirator performance
5. Evaluation and development of samplers for aerosol, bioaerosols and chemicals
6. Biological monitoring, particularly in establishing biomarkers for assessing exposure to chemicals, aerosols and bioaerosols
7. Exposure assessment and control of nanoparticles