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EDUCATION

1996	Sc.D.	Environmental Pollution Environmental Health Management	Department of Environmental Health School of Public Health, Harvard University, Cambridge, MA, USA
1992	M.S.	Air Pollution Environmental Health Management	Department of Environmental Health School of Public Health Harvard University, Cambridge, MA, USA
1988	B.S.	Atmospheric Sciences	Department of Atmospheric Sciences National Taiwan University, Taipei, Taiwan

EMPLOYMENT

2021 Jan ~ Present	Deputy Director	RCEC, Academia Sinica, Taiwan
2019 July ~ Present	Deputy Executive Secretary	CSS, Academia Sinica, Taiwan
2014 July ~ Present	Research Fellow	RCEC, Academia Sinica, Taiwan
2006 Aug ~ Present	Joint Faculty	Department of Atmospheric Sciences, National Taiwan Uni., Taiwan
2006 Aug ~ Present	Adjunct Faculty	Institute of Environmental Health, National Taiwan Uni., Taiwan

HONORS & AWARDS

2020 Team of Excellence (Top 5) of the 2020 Presidential Hackathon,
(https://presidential-hackathon.taiwan.gov.tw/)

2018 Member of RCAP, ISC (formally International Council for Science (ICSU)),
2018 Nov ~ 2019 Dec

2016 Best Poster Awards and presented, the 23rd Pacific Science Congress, Taiwan

2015 Member of Regional Advisory Committee, Regional Centre for Future Earth in Asia, Japan,
2015 Nov ~ 2019 Dec

2013 Highlighted in the newsletter, International Council for Science (ICSU) Insight, Paris

2012 Highlighted in the A-IMBN Research

2004 Chiu-sen Award, Chinese Association for Aerosol Research, Taiwan

1992 Alumni Scholarship, School of Public Health, Harvard University, Cambridge, MA, USA

RESEARCH INTERESTS

Exposure and Risk Assessment, Organic Aerosols, Environmental Health Management, Health Adaptation, Heat Stress, Heat Vulnerability Assessment

ACADEMIC SERVICE & RESEARCH PROJECTS

Positions/Services in Internationally Eminent Academia Organizations

1. Member, Lead Author Group, Low-Cost Sensor Document for **World Meteorological Organization**, WMO (WMO), 2nd, June 2020– December 2020.
2. Member, Regional Committee for the Asia and the Pacific (RCAP), Regional Office for the Asia and the Pacific (ROAP), **International Science Council** (ISC, formally International Council for Science (ICSU)); November 2018 – December 2019.
3. Member, Scientific Steering Committee, Monsoon Asia Integrated Research for Sustainability Study (**MAIRS**)-Future Earth, September 2018 – Present.
4. Member, Editorial Group, Low-Cost Sensor Document for **World Meteorology Organization** (WMO), August 2017 – March 2018.
5. Member, Advisory Group, **Health Knowledge-Action Network (KAN) for Future Earth** (a major ICSU supported international scientific activity for sustainability science); November 2016 – Present.
6. Member, **Regional Advisory Committee, Regional Centre for Future Earth in Asia**, located in Research Institute of Humanity and Nature, Kyoto, Japan. November 2015 – December 2019.
7. Member, International Global Atmospheric Chemistry (IGAC) - Monsoon Asia and Oceania Networking Group (MANGO); June 2015 – Present.
8. Executive Director, Integrated Research on Disaster Risk (IRDR), International Center of Excellence in Taipei (ICoE-Taipei), IRDR is a major ICSU scientific activity; June 2015 – July 2017.
9. Member, Scientific Steering Committee, **International Global Atmospheric Chemistry Project** (IGAC); January 2010 – December 2015.

RESEARCH HIGHLIGHTS

My research expertise is **Environmental Health Sciences** which assesses potential environmental hazards that affect human health. The ultimate goal is to reduce health risks related to any environmental exposure. My research focuses on two themes, aiming at two biggest environmental health challenges in Asia nowadays. The first one is **climate change and health adaptation**. The second theme is **urban air pollution** (mainly particulate matters with aerodynamic diameter equal to or less than 2.5 micron, $PM_{2.5}$). For the first theme, under the funding support of Sustainability Science of Academia Sinica, I was leading an integrated project “Integrated Multi-source and High-resolution Heawave Vulnerability Assessment of Taiwan (2015-2017)”, with the team comprised with experts of environmental science, information technology, social science

and public health. This project focused on heat stress enhanced due to climate change. The first important research outcome was presented in Cheng et al. (2019) which proposed a new approach to selecting proper health-based thresholds for a heat warning system with an appropriate heat-stress indicator, based on records of all-cause mortality, heat related hospital admissions, and heat-related emergency visits in Taiwan. It provided health-based evidences with the aim to establishing an effective heat warning system to reduce health risks on hot days under climate change.

The second research outcome was assessing important urban-design factors of public health as presented in Shen & Lung 2016, 2017, and 2018. We applied partial least squares modeling to analyze the degree to which green structure reduces mortality of cardiopulmonary diseases, taking into account the mediation effects of green space on air pollution and temperature which both affect public health. Its contribution is on providing practical solutions in urban design considering different green structure factors (such as fragmentation) to reduce the health impacts through reduction of air pollution and heat stress. The most important merit of the aforementioned publications is that they go beyond assessing health impacts of climate change; they actually explored potential ways of reducing health risks by implementing proper urban design and establishing effective heat warning system.

For the second theme, under the support of Sustainability Science of Academia Sinica, I am leading an integrated project "Trans-disciplinary $PM_{2.5}$ Exposure Research in Urban Areas for Health-oriented Preventive Strategies (2018-2020)" with a multidisplinary team to assess $PM_{2.5}$ exposure sources and evaluate potential way of reducing exposure and health risks. Using the newly developed low-cost sensors, we assessed the contributions of various community sources to residents' exposure (Lung et al., 2020). Furthermore, based on these results, I am leading an international project "Health Investigation and Air Sensing for Asian Pollution (AI on Hi-ASAP)", with research teams from 10+ countries in Asia. This international collaboration will further raise the visibility and scientific values of our research.

PUBLICATIONS (*: corresponding author, most important papers from 2015 ~ present)

1. Wang, W. C. V.; **Lung, S. C. C.***; Liu, C. H.; Wen, T. Y. J.; Hu, S. C.; Chen, L. J. (2021.02). Evaluation and Application of a Novel Low-Cost Wearable Sensing Device in Assessing Real-Time $PM_{2.5}$ Exposure in Major Asian Transportation Modes. *Atmosphere*, 12(2), 270. DOI: 10.3390/atmos12020270. IF: 2.397 and ranking 48/93=51.6% (Meteorology & Atmospheric Sciences)
2. **Lung, S. C. C.***; Tsou, M. C. M.; Hu, S. C.; Hsieh, Y. H.; Wang, W. C. V.; Shui, C. K.; Tan, C. H. (2020.12) Concurrent assessment of personal, indoor, and outdoor $PM_{2.5}$ and PM1 levels and source contributions using novel low-cost sensing devices. *Indoor Air*, 16913006. DOI: 10.1111/ina.12763. IF: 4.739 and ranking 19/193= 9.8% (Public, Environmental & Occupational Health)
3. Chiu, C. H.; **Lung, S.C.C.*** (2020.12) Assessment of low-frequency noise from wind turbines under different weather conditions. *Journal of Environmental Health Science and Engineering*,

478. DOI: 10.1007/s40201-020-00478-9. IF: 2.179 and ranking 148/265=55.8% (Environmental Sciences)

4. **Lung, S. C. C.***; Chen, N.; Hwang, J. S. Hu, S.C.; Wang, W.C.V.; Wen, T.Y.J.; Liu, C.H. (2020.11) Panel study using novel sensing devices to assess associations of $PM_{2.5}$ with heart rate variability and exposure sources. *Journal of Exposure Science and Environmental Epidemiology*, 30(6), 937-948. DOI: 10.1038/s41370-020-0254-y. IF: 3.531 and ranking 38/193=19.6% (Public, Environmental & Occupational Health)
5. Shen, Y.S.; **Lung, S.C.C.*** (2020.10) Multiple impacts and pathways of urban form and environmental factors on cardiovascular mortality. *Science of the Total Environment*, 738, 139512. DOI: 10.1016/j.scitotenv.2020.139512. IF: 6.551 and ranking 22/265 =8.3 % (Environmental Sciences)
6. **Lung, S. C. C.***; Wang, W.C.V.; Wen, T.Y.J.; Liu, C.H.; Hu, S.C. (2020.05) A versatile low-cost sensing device for assessing PM2.5 spatiotemporal variation and quantifying source contribution. *Science of the Total Environment.* DOI: 10.1016/j.scitotenv.2020.137145. IF: 5.589 and ranking 27/251 =10.7 % (Environmental Sciences)
7. Cheng, Y.T.; **Lung, S.C.C.***; Hwang, J.S.* (2019.03) New approach to identifying proper thresholds for a heat warning system using health risk increments. *Environmental Research,* (170), 282-292, DOI: 10.1016/j.envres.2018.12.059. IF: 5.026, ranking 14/185 =7.6% (Public, Environmental & Occupational Health)
8. Wu, C.D.; Zeng, Y.T.; **Lung, S.C.C.*** (2018.12) A hybrid kriging/land-use regression model to assess $PM_{2.5}$ spatial-temporal variability. *Science of the Total Environment,* (645), 1456-1464, DOI: 10.1016/j.scitotenv.2018.07.073. IF: 5.589, ranking 27/250 =10.8% (Environmental Sciences)
9. Hsu, C.Y.; Wu, C.D.; Hsiao, Y.P.; Chen, Y.C.; Chen, M.J.; **Lung, S.C.C.*** (2018.12). Developing land-use regression models to estimate PM2.5-bound compound concentrations. Remote Sens. (10)2, 1971. DOI: 10.3390/rs10121971. IF: 4.118 and ranking 7/30 =23.3% (Remote Sensing)
10. **Lung, S.C.C**; Chou, S.W.; Chen J.P.; Wen, P.C.; Su, H.J.J.; Tsai, I.C.; Shen, Y.S. (2018.11) Science plan of "climate change and health adaptation". Journal of Taiwan Land Research, 21(2), 209-239. DOI：10.6677/JTLR.2018.21.02. (TSSCI) (in Chinese)
11. Shen, Y.S.; **Lung, S.C.C.*** (2018.08) Identifying critical green structure characteristics for reducing the suicide rate. Urban Forestry & Urban Greening journal (34),147-153. DOI: 10.1016/j.ufug.2018.06.005. IF: 3.043 and ranking 8/67 =11.9% (Forestry)
12. Tung, J.C.; Huang, W.C.; Yang, J.C.; Chen, G.Y.; Fan, C.C.; Chien, Y.C.; Lin, P.S.; **Lung, S.C.C.*** and Chang, W.C.* (2017.11) Auramine O, an incense smoke ingredient, promotes lung cancer malignancy. Environmental Toxicology, 32(11), 2379-2391. DOI: 10.1002/tox.22451. IF: 2.649 and ranking 24/91=26.4% (Water Resources)
13. Wu, C.D.; Chen, Y.C.; Pan, W.C.; Zeng, Y.T.; Chen, M.J.; Guo, Y.L. & **Lung, S.C.C.*** (2017.5).

Land-use regression with long-term satellite-based greenness index and culture-specific sources to model $PM_{2.5}$ spatial-temporal variability. *Environmental Pollution*, 224, 148-157. Doi: 10.1016/j.envpol.2017.01.074. IF: 5.714, ranking 25/250 =10%) (Environmental Sciences)

14. Shen, Y.S. and **Lung, S.C.C.*** (2017.02) Mediation pathways and effects of green structures on respiratory mortality via reducing air pollution. Scientific Reports, 7, 42854. DOI: 10.1038/srep42854. IF: 4.011 and ranking 15/69 =21.7% (Multidisciplinary Sciences)
15. Shen, Y.S. **Lung, S.C.C.*** (2016.10). Can green structure reduce the mortality of cardiovascular diseases? *Science of The Total Environment*, 566-567, 1159-1167. Doi: 10.1016/j.scitotenv.2016.05.159. (IF: 5.589, ranking 27/250 =10.8%) (Environmental Sciences)
16. Wu, C.D. and **Lung, S.C.C.*** (2016.04) Application of 3-D Urbanization Index to assess impact of urbanization on air temperature. Scientific Reports, 6, 24351. DOI: 10.1038/srep24351. IF: 4.011 and ranking 15/69=21.7% (Multidisciplinary Sciences)
17. **Lung, S.C.C.*** and Liu, C.H. (2015.8). Fast analysis of 29 polycyclic aromatic hydrocarbons (PAHs) and nitro-PAHs with ultra-high performance liquid chromatography-atmospheric pressure photoionization-tandem mass spectrometry. *Scientific Reports*, 5:12992. Doi: 10.1038/srep12992. IF: 4.011, ranking 15/69=21.7% (Multidisciplinary Sciences)

Book Chapter/Dissertation/Thesis:

Sung, F.C.; Wang, Y.C.; Lin, Y.K. and **Lung, S.C.C.** (2017.09) Chapter IV: policy recommendations for proactive health services in response to climate change. *Climate Change and Human Health*, by Committee of Climate Change and Human Health, Forum of National Health Research Institutes (NHRI) (in Chinese)

Wu, C.D.; **Lung, S.C.C.**; Chuang, Y.C. and Jan, J.F. (2013.12) Forest landscape change at shihmen reservoir catchment from 2002 to 2007. *Environmental History in East Asia: Interdisciplinary Perspectives*, Liu, T.J., Ed., ISBN-13: 978-0415717700.

OTHERS

Plenary or Invited Speeches Given in the International Conferences (from 2016 ~ present):

1. Lung, S.C.C. (2019). 2019 Taiwan Geosciences Assembly, “Proposing a Practical Health-based Heat Warning System”, held by Taiwan Geosciences Association, Taipei, May, 14-15, 2019. **(Invited speaker)**
2. Lung, S.C.C. (2019). 23rd IUHPE World Conference on Health Promotion, “Health Literacy for Outdoor Workers on Heat Stress in Taiwan”, held by International Union for Health Promotion and Education (IUHPE), Rotorua, Aotearoa New Zealand, April, 7-11, 2019. **(Invited speaker)**
3. Lung, S.C.C. (2018). Future Earth session, The 18th Science Council of Asia Conference (SCA), "Future Earth in Taiwan", held by Science Council of Japan (SCJ), Tokyo, Japan, December, 5-7, 2018. **(Invited plenary speaker)**
4. Lung, S.C.C. (2018). Global Land Program 2018 Asia Conference “Transitioning to sustainable development of land systems through teleconnections and telecouplings” held by Future Earth

Global Land Project, Taipei, September 3-5, 2018. **(Invited plenary speaker)**

5. Lung, S.C.C. (2017). 2017 Asia Oceania Geosciences Society (AOGS) Conference, Asian Perspectives, Research Priorities, and Capacity Building Focus of Future Earth Activities in Taiwan. Invited presentation at the AOGS 14th Annual Meeting, organized by Asia Oceania Geosciences Society (AOGS), Singapore, August 6-11, 2017. Presentation day: August 10, 2017. **(Invited speaker)**
6. Lung, S.C.C. (2017). Asian Culture-related Air Pollution Sources and Health Implications. Invited presentation at the 17th Conference of the Science Council of Asia, organized by Science Council of Asia (SCA), Manila, Philippines, June 14-16, 2017. Presentation day: June 16, 2017. **(Invited plenary speaker)**
18. Lung, S.C.C. (2017). Co-benefit Thinking to Link Atmospheric Chemistry Research to Pollution-Reduction Policy. Invited presentation at the third Workshop on Atmospheric Composition and the Asian Monsoon (ACAM), Guangzhou, China, June 5-9, 2017. Presentation day: June 6, 2017. **(Invited plenary speaker)**
19. Lung, S.C.C.; Wang, D.W.; Wang, W.C. & Huang, A.F.M. (2016). Identifying Climate Service for Health with Heat Vulnerability Assessment. Invited presentation at the CWB-APCC Workshop on Climate Service for Health, organized by Central Weather Bureau, Taipei, Taiwan, October 12-14, 2016. Presentation day: October 13, 2016. **(Invited speaker)**
20. Lung, S.C.C.; Liu, C.H. & Wang, P.K. (2016). Asian Perspective and Research Direction Identified in Events Held by Future Earth, Taipei. Invited presentation at the 16th Science Council of Asia Conference, organized by the National Academy of Sciences of Sri Lanka (NASSL) and the National Science Foundation, Colombo, Sri Lanka, May 30-June 1, 2016. Presentation day: May 31, 2016. **(Invited speaker)**
21. Lung, S.C.C.; Wen, T.Y.; Liu, C.H. & Engling, G. (2016). Analytical Method Establishment of Important Organic Compounds and Source Molecular Markers. Invited presentation at the National Sun Yat-sen University, Kaohisung, Taiwan. Presentation day: April 20, 2016. **(Invited speaker)**