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EDUCATION

2004/09 – 2008/12 Ph.D. Institute of Environmental Engineering, National Sun Yat-Sen University, Taiwan
2000/09 – 2002/06 M.S. Institute of Environmental Engineering, National Sun Yat-Sen University, Taiwan
1995/09 – 2000/06 B.A. Depart. of Marine Environment and Engineering, National Sun Yat-Sen University, Taiwan

EMPLOYMENT

2020/09 – present	Project Research Fellow	RCEC, Academia Sinica, Taiwan
2012/07 – 2020/08	Post-doctoral Fellow	RCEC, Academia Sinica, Taiwan
2011/11 – 2012/06	Manager	CHUNG'S Utility Co., Ltd., Taiwan
2009/01 – 2011/10	Post-doctoral Fellow	BRC, Academia Sinica, Taiwan

HONORS & AWARDS

2018 Runner-up, IBM x FET Artificial Intelligence Technology Competition, Taiwan
2016 Best Poster Award, The 23rd Pacific Science Congress, Taiwan

PROFESSIONAL SERVICE

- Convener, Health Investigation and Air Sensing for Asian Pollution (Hi-ASAP), International Global Atmoshperic Chemistry–Monsoon Asia and Oceania Networking (IGAC-MANGO), 2019 – present.

RESEARCH INTEREST

My research lies in the field of air pollution exposure assessment, urban heat risk assessment, small sensors-device development, and aerosol sampling. I was among the first to attend the Artificial Intelligence training programs of Taiwan AI Academy in 2018. After finishing the AI training program, I started to develop the methodology on the environmental and health-related studies with Machine Learning. I have also modified and developed a numerical algorithm of WBGT to assess environmental heat stress for weather stations without traditional thermometers of black globe and natural wet bulb. For now, I developed an application of machine learning on measurement improvement of low-cost sensing devices.

RESEARCH HIGHLIGHTS

1. **Machine-learning-based in-situ correction method of street-level low-cost $PM_{2.5}$ sensors**
   By combining machine learning methods and the readings of street-level low-cost PM2.5 sensors (LCPMSs), the in-situ correction of LCPMSs is established for improvement of monitoring data of PM2.5 sensors, which were widely distributed in the communities without calibration. Therefore, the correction model can be established to greatly enhance the reliability and usefulness of LCPMS networks and thus, expands the applications of machine learning in the field of environmental monitoring. With the established in-situ data correction models presented in this work, accurate $PM_{2.5}$ data from the sensor networks can be further applied to citizen science, public education, environmental research, and policymaking [1].
   Reference: [1]. Wang et al., 2020 "Sensors"
2. **Mapping hotspots of urban heat stress areas by a theoretical WBGT model**
   Wet-bulb globe temperature (WBGT) is a well-known heat-stress indicator, since it is associated with heat-related health impacts. The WBGT index is calculated as a weighted average of the dry temperature (Ta), natural wet-bulb temperature (Tw), and globe temperature (Tg), measured directly from heat stress monitors such as the QuesTempTM monitors (TSI Incorporated, Minnesota, USA). In my previous study, WBGT at ground level was found to be on average 0.2–2.9 °C higher than at higher levels (above a height of 10–15 m). However, these monitoring instruments for Tg and Tw are usually not weather-resistant, and can be difficult to maintain. An alternative method was applied to calculate the WBGT index based on numerical models. A WBGT model, which originated from Liljegren et al. (2008), is used to estimate Tg and Tw based on several theoretical algorithms using the inputs of the dry-bulb temperature, relative humidity, wind speed, and solar radiation. I developed a Visual basic package to make the iterative calculation of these theoretical algorithms much easier, and then rewrote the codes in a Python package which can be embedded on a website for an expanding application base. However, the impact of the solar zenith angle was miscalculated in the original equations, which led to extreme overestimation of Tw in the early morning and in the late afternoon at sunset. Therefore, I corrected this in the original codes, and adjusted Tg be in concordance with ISO 7243. This modified WBGT program has been validated according to the observations of the WBGT instrument, and was delivered to the Central Weather Bureau of Taiwan for computational estimation of the heat stress index, directly in relation to public health.

REPRESENTATIVE PUBLICATIONS (*: corresponding author)

1. **Wang, W.C.V.**, Lung, S.C.C, Liu, C.H., Wen, T.Y.J., Hu, S.C. and Chen, L.J. (2021) 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, 270. https://doi.org/10.3390/atmos12020270 (SCI, I.F.=2.686)
2. **Wang, W.C.V.**, Lung, S.C.C, and Liu, C.H. (2020) Application of Machine Learning for the in-Field Correction of a $PM_{2.5}$ Low-Cost Sensor Network. *Sensors*, 20, 5002.

https://doi.org/10.3390/s20175002 (SCI, I.F.=3.576)

3. **Wang, W.C.V.**, Lung, S.C.C, Liu, C.H. and Shui, C.K. (2020) Laboratory Evaluations of Correction Equations with Multiple Choices for Seed Low-Cost Particle Sensing Devices in Sensor Networks. *Sensors*, 20, 3661. https://doi.org/10.3390/s20133661 (SCI, I.F.=3.576)
4. **Wang, W.C.V.**, Lin, T.H., Liu, C.H., Lung, S.C.C and Su, C.W. (2020) Fusion of Environmental Sensing on $PM_{2.5}$ and Deep Learning on Vehicle Detecting for Acquiring Roadside $PM_{2.5}$ Concentration Increments. *Sensors*, 20, 4679. https://doi.org/10.3390/s20174679 (SCI, I.F.=3.576)
5. Lung, S.C.C, **Wang, W.C.V.**, Wen, T.Y.J., Liu, C.H., and Hu, S.C. (2020) A Versatile Low-cost Sensing Device for Assessing $PM_{2.5}$ Spatiotemporal Variation and Quantifying Source Contribution. *Science of the Total Environment*, 716, 137145. https://doi.org/10.1016/j.scitotenv.2020.137145 (SCI, I.F.=7.963)
6. Lung, S.C.C, Tsou, M.C.M., Hu, S.C., Hsieh, Y.H., Wang, W.C.V., Shui, C.K., and Tan, C.H. (2020) Concurrent Assessment of Personal, Indoor, and Outdoor $PM_{2.5}$ and PM1 Levels and Source Contributions using Novel Low-cost Sensing Devices. *Indoor Air*. https://doi.org/10.1111/ina.12763 (SCI, I.F.=5.770)
7. Lung, S.C.C, Chen, N., Hwang, J.S., Hu, S.C., Wang, W.C.V., Wen, T.Y.J., and Liu, C.H. (2020) Panel Study Using Novel Sensing Devices to Assess Associations of $PM_{2.5}$ with Heart Rate Variability and Exposure Sources. *Journal of Exposure Science & Environmental Epidemiology*, 30, 937-348. https://doi.org/10.1038/s41370-020-0254-y (SCI, I.F.=5.563)
8. Dong, C.D., Lung, S.C.C., Chen, C.W., Lee, J.S., Chen, Y.C., Wang, W.C.V., Chen, C.J., Hung, C.M. and Lin, C.H. (2019) Assessment of the Pulmonary Toxic Potential of Nano-Tobacco Stem-Pyrolyzed Biochars. *Environmental Science: Nano*, 6, 1527-1535. https://doi.org/10.1039/C8EN00968F (SCI, I.F.=8.131)
9. Chen, Y.C., Lin, C.H., Lung, S.C.C., Chen, K.F., Wang, W.C.V., Chou, C.T. and Lai, C.H. (2019) Environmental Concentration of Spray Paint Particulate Matters Causes Pulmonary Dysfunction in Human Normal Bronchial Epithelial BEAS-2B Cell. *Process Safety and Environmental Protection*, 126, 250-258. https://doi.org/10.1016/j.psep.2019.04.013 (SCI, I.F.=6.158)
10. Yan, J., Huang, C.C., Lung, S.C.C., Wang, W.C., Suo, G., Lin, Y.J., Lai, C.H. and Lin, C.H. (2017) ROCK Inhibitor Y-27632 Attenuates Early Endothelial Dysfunction Caused by Occupational Environmental Concentrations of Carbon Black Nanoparticles. *Environmental Science: Nano*, 4, 1525-1533. https://doi.org/10.1039/C7EN00123A (SCI, I.F.= 8.131)
11. Yan, J., Lai, C.H., Lung, S.C.C., Wang, W.C., Huang, C.C., Chen, G.W., Suo, G., Choug, C.T. and Lin, C.H. (2017) Carbon Black Aggregates Cause Endothelial Dysfunction by Activating ROCK. *Journal of Hazardous Materials*, 338, 66-75. https://doi.org/10.1016/j.jhazmat.2017.05.025 (SCI, I.F.=10.588)
12. Yan, J., Lai, C.H., Lung, S.C.C., Chen, C., Wang, W.C., Huang, P.I. and Lin, C.H. (2017) Industrial $PM_{2.5}$ Cause Pulmonary Adverse Effect Through RhoA/ROCK Pathway. *Science of the Total Environment*, 599-600, 1658-1666. https://doi.org/10.1016/j.scitotenv.2017.05.107 (SCI,

I.F.= 7.963)

13. Yan, J., Chen, L., Huang, C.C., Yang, L., Wang, W.C., Lin, P.H., Suo, G. and Lin, C.H. (2017) Consecutive Evaluation of Graphene Oxide and Reduced Graphene Oxide Nanoplatelets Immunotoxicity on Monocytes. *Colloids and Surfaces B-Biointerfaces*, 153, 300-309. https://doi.org/10.1016/j.colsurfb.2017.02.036 (SCI, I.F.= 5.268)
14. Yu, J., Lin, Y.H., Yang, L., Huang, C.C., Chen, L., Wang, W.C., Chen, G.W., Yan, J., Sawettanun, S. and Lin, C.H. (2016) Improved Anticancer Photothermal Therapy using the Bystander Effect Enhanced by Antiarrhythmic Peptide Conjugated Dopamine-Modified Reduced Graphene Oxide Nanocomposite. *Advanced Healthcare Materials*, 6, 1600804. https://doi.org/10.1002/adhm.201600804 (SCI, I.F.=9.933)
15. Yang, Y., Wang, W.C., Lung, S.C.C., Sun, Z., Chen, C., Chen, J.K., Zou, Q., Lin, Y.H., Suo, G. and Lin, C.H. (2016) Polycyclic Aromatic Hydrocarbons Are Associated with Increased Risk of Chronic Obstructive Pulmonary Disease during Haze Events in China. *Science of the Total Environment*, 574, 1649-1658. https://doi.org/10.1016/j.scitotenv.2016.08.211 (SCI, I.F.= 7.963; co-first author)
16. Sun, Z., Yang, L., Chen, K.F., Chen, G.W., Peng, Y.P., Chen, J.K., Suo, G., Yu, J., Wang, W.C.* and Lin, C.H.* (2016) Nano Zerovalent Iron Particles Induce Pulmonary and Cardiovascular Toxicity in an in Vitro Human Co-Culture Model. *Nanotoxicology*, 10, 881-890. https://doi.org/10.3109/17435390.2015.1133861 (SCI, I.F.= 5.913; co-corresponding author)

Others (Invited Talks，Keynote speech et al.)

1. Wang, W.C.V. (2021.10) Dataset integration for community, outdoor, indoor, and personal source evaluations (AI on Hi-ASAP). Academia Sinica, Taiwan.
2. Wang, W.C.V. (2020.10) Data Analysis on Community PM2.5 Hot-Spot Identification and Quantification. Advanced Institute on Health Investigation and Air Sensing for Asian Pollution (AI on Hi-ASAP). Academia Sinica, Taiwan.
3. Wang, W.C.V. (2019.9) Quality Control and Quality Assurance Protocols. Advanced Institute on Health Investigation and Air Sensing for Asian Pollution (AI on Hi-ASAP). Academia Sinica, Taiwan.
4. Wang, W.C. (2017.6) Community Observation. Street Canyon Workshop - Aerosol Observation and Model Validation. Academia Sinica, Taiwan.