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EDUCATION

2004 – 2009	Ph.D.	Dept. of Energy, Environmental and Chemical Engineering, Washington University in St. Louis, St. Louis, MO, USA
2001 – 2003	M.S.	Dept. of Civil and Environmental Engineering, Stanford University, Stanford, CA, USA
1994 – 1998	B.S.	Dept. of Civil Engineering, National Taiwan University, Taipei, Taiwan

EMPLOYMENT

2018/08 – present	Associate Professor	Graduate Inst. of Environmental Engineering, National Taiwan University, Taiwan
2016/08 – 2018/07	Associate Professor	Graduate Inst. of Environmental Engineering, National Central University, Taiwan
2010/08 – 2016/07	Assistant Professor	Graduate Inst. of Environmental Engineering, National Central University, Taiwan
2009/08 – 2010/07	NRC Research Fellow	NPPTL, NIOSH Pittsburgh, Center for Disease Control, USA

HONORS & AWARDS

2018	「Distinguished Young Scholar Research Proposal」awarded from the Ministry of Science and Technology, Taiwan
2016	"Chiu-Sen Award" by Taiwan Association for Aerosol Research (TAAR)
2013 & 2014	「Outstanding Young Scientist of National Central University」
2013	「Distinguished Young Scholar Research Proposal」awarded from the Ministry of Science and Technology, Taiwan
2012	TCOH Ho-Yuan Chang Memorial Outstanding Conference Paper Award
2012	Best Conference Paper Award in 24th Annual Meeting of the Chinese Institute of Environmental Engineering
2012	AIHA David L. Swift Memorial Outstanding Aerosol Paper Award, (Title: “Evaluation of Nano- and Submicron Particle Penetration through Ten Nonwoven Fabrics Using a

Wind-Driven Approach" *Journal of Occupational and Environmental Hygiene*, 2010, 8, 13-22.)

2009 The National Academies Postdoctoral and Senior Research Award, National Research Council, USA.

2006 – 2009 Boeing Fellowship, McDonnell International Scholar Academy, U.S.A.

PROFESSIONAL SERVICE

- 2020 – now Editoral Board Member of Journal of Hazardous Materials Letters
- 2017 – now Editor of Aerosol and Air Quality Research
- 2016 – now Affiliate Graduate Faculty Member, Virginia Commonwealth University, USA

RESEARCH INTEREST

My current research interests include Measurement and Monitoring of Particulate Matter, Aerosol Filtration and Separation Technologies, Particle Instrumentation and Characterization, Nanoparticle Generation and Physics, Aerosol and Cloud Microphysics, Health Effects of Particulate Matters.

RESEARCH HIGHLIGHTS

- **Volatility, Effective Density and Oxidative Potential of Aerosol Particles in The Urban Area**

  In recent years, the toxicological mechanisms of PM-related health effects are thought to involve the generation of reactive oxygen species (ROS) derived from particulate matter (PM), since it could induce oxidative stress and cause cellular damages. Oxidative potential (OP), defined as a measure of the capacity of particles to oxidize target molecules, can be viewed as the ability to generate ROS. Thus, OP is generally used as an indicator to quantify the potential toxicity of PM and to study the correlation between PM's physiochemical characteristics and human health. Volatility, effective density and OP are intercorrelated and dynamically evolving with time in the ambient environment. However, these aerosol properties have not been examined simultaneously in a roadside environment with a significant fraction of motorcycles in the vehicle fleet as is typical of Southeast Asia. To explore the volatility, oxidation potential, and effective density of aerosol particles, a monitoring station was established and located at the Graduate Institute of Environmental Engineering, National Taiwan University (25.02 ^{o}N, 121.54 ^{o}E), Taipei, Taiwan. It is adjacent to the main street and right at the crossing interception. The average daily traffic flux was recorded and analyzed by a YOLOv3 (You Only Look Once Version 3). Aerosol volatility and effective density were measured by the VT-DMA-APM-CCNc system, and air sample was continuously collected by a Liquid Spot Sampler (LSS, AD series 110A), which is using a three-stage water condensational growth tube to directly collect all PM (including water-soluble and insoluble) into the working liquid.

- **Physical, Chemical and Biological Characteristics of Aerosol Particle Emitted from an Urban Wastewater Treatment Plant**

  Nowadays, Waste Water Treatment Plant (WWTP) is a crucial facility of maintaining the quality of natural water resources, and it is increasingly important for developing alternative urban water sources through reuse practice. However, through discharging, mixing, aerating, and spraying of sewage, significant amounts of bioaerosols and particulate matters can be produced during the wastewater treatment process and pose a high health risk to workers [1]. The risks associated with exposure to emissions from WWTPs should call for more research, stronger regulatory frameworks and safer design consideration. Secondly, in response to the presence of antibiotics in the wastewater, the bacterial generation could be stimulated to evolve with antibiotic resistance genes (ARGs). Although antibiotic resistance bacteria (ARB) and ARG have been found in the water sampled in WWTPs, only few researches on exploring the ARG and ARB in air samples. This work expose that the potential risk of inhalation exposure of emerging contaminants (solely $PM_{1.0}$) and bio-aerosols (mostly in $PM_{2.5-10}$) in the WWTPs should not be neglected, and these effects certainly merit urgent investigations.

  Reference : [1]. Hsiao et al. 2020

REPRESENTATIVE PUBLICATIONS (*: corresponding author)

1. **Ta-Chih Hsiao***, Angela Yu-Chen Lin, Wan-Chien Lien, Yen-ChingLin (2019, Dec). Size distribution, biological characteristics and emerging contaminants of aerosols emitted from an urban wastewater treatment plant. *Journal of Hazardous Materials*.
2. **Ta-Chih Hsiao***, Da-Ren Chen, (2019, Jul). Modeling of the Transitional Pressure Drop of Fibrous Filter Media Loaded with Oil-coated Particles. *Aerosol and Air Quality Research*, 19(7): 1625-1635.
3. Hung-Li Wang, Hsin Yeh, Bin-Han Li, Chia-Her Lin, **Ta-Chih Hsiao***, De-Hao Tsai, (2019, Jun). Zr-Based Metal-Organic Framework Nanocarrier for the Controlled Release of Ibuprofen. *ACS Applied Nano Materials*, 3329-3334.
4. Shiro Hatakeyama, Yasuhito Igarashi, Johannes Stahelin, Gannet Hallar, **Ta-Chih Hsiao**, Daniel A Jaffe, (2019, Jun). Preface to Special Issue-Atmospheric Chemistry and Physics at Mountain Sites 2017. *Aerosol and Air Quality Research*, 19(6): i-i.
5. Po-Kai Chang, **Ta-Chih Hsiao***, Guenter Engling, Jyh-Chen Chen (2019, May). Computational fluid dynamics study of the effects of flow and geometry parameters on a linear-slit virtual impactor for sampling and concentrating aerosols. *Journal of Aerosol Science*, 131: 28-40.
6. Yung-Ho Hsu, Hsiao-Chi Chuang, Yu-Hsuan Lee, Yuh-Feng Lin, Yi-Jie Chen, **Ta-Chih Hsiao**, Mei-Yi Wu, Hui-Wen Chiu (2019, May). Traffic-related particulate matter exposure induces nephrotoxicity in vitro and in vivo. *Free Radical Biology and Medicine*, 135: 235-244.

7. **Ta-Chih Hsiao***, Guenter Engling, Po-Yan Chang, Po-Kai Chang, Ming-Tung Chuang (2019, Apr). Effect of flow rate on detection limit of particle size for a steam-based aerosol collector. *Atmospheric Environment*, 202, 160-166.
8. Chi-Hsiang Shih, Jen-Kun Chen, Li-Wei Kuo, Kuan-Hung Cho, **Ta-Chih Hsiao**, Zhe-Wei Lin, Yi-Syuan Lin, Jiunn-Horng Kang, Yu-Chun Lo, Kai-Jen Chuang, Tsun-Jen Cheng, Hsiao-Chi Chuang (2018, Nov). Chronic pulmonary exposure to traffic-related fine particulate matter causes brain impairment in adult rats. *Particle and Fibre Toxicology*, 15, (1), 44..
9. Kin-Fai Ho, Kuan-Che Wu, Xinyi Niu, Yunfei Wu, Chong-Shu Zhu, Feng Wu, Jun-Ji Cao, Zhen-Xing Shen, **Ta-Chih Hsiao**, Kai-Jen Chuang, Hsiao-Chi Chuang (2018, Nov). Contributions of local pollution emissions to particle bioreactivity in downwind cities in China during Asian dust periods. *Environmental Pollution*, 245, 675-683..
10. Ming-Tung Chuang, Shih-Yu Chang, **Ta-Chih Hsiao**, Yun-Ru Lu, Tsung-Yeh Yang (2018, Oct). Analyzing major renewable energy sources and power stability in Taiwan by 2030. *Energy Policy*, 125, 293-306..
11. **Ta-Chih Hsiao***, Li-Hao Young, Yu-Chun Tai, Po-Kai Chang (2018, Aug). Effects of temperature, pressure, and carrier gases on the performance of an aerosol particle mass analyser. *Atmos. Meas. Tech.*, 11, (8), 4617-4626.
12. Tzu-Ting Yang, Kai-Jen Chuang, Nai-Yun Chang, Chih-Hong Pan, Wei-Hang Liao, Chien-Chieh Liao, Yang-Hwei Tsuang, Hsiao-Yun Wen, **Ta-Chih Hsiao***, Hsiao-Chi Chuang (2018, Jul). Exposure assessment of particulate and gaseous pollutants emitted during surgery in operating rooms of different specialties. *Air Quality, Atmosphere & Health*, 11, (8), 937-947..
13. Jun-Yu Liu, **Ta-Chih Hsiao**, Kang-Yun Lee, Hsiao-Chi Chuang, Tsun-Jen Cheng, Kai-Jen Chuang (2018, Jan). Association of ultrafine particles with cardiopulmonary health among adult subjects in the urban areas of northern Taiwan.. *Science of The Total Environment*, 627, 211-215.
14. Hsiao-Chi Chuang, **Ta-Chih Hsiao**, Chii-Hong Lee, Justin Chun-Te Lin, Kai-Jen Chuang, Po-Hao Feng, Tsun-Jen Cheng (2017, Oct). Effects of physical characteristics of carbon black on metabolic regulation in mice. *Environmental Pollution*, 232, 494-504.
15. Hsiao-Chi Chuang, Ting-Yao Su, Kai-Jen Chuang, **Ta-Chih Hsiao**, Hong-Ling Lin, Yuan-Ting Hsu, Chih-Hong Pan, Kang-Yun Lee, Shu-Chuan Ho, Ching-Huang Lai (2017, Oct). Pulmonary exposure to metal fume particulate matter cause sleep disturbances in shipyard welders. *Environmental Pollution*, 232, 523- 532.
16. Wei-Chang Chang, Shiuh-Cherng Cheng, Wei-Hung Chiang, Jia-Liang Liao, Rong-Ming Ho, **Ta-Chih Hsiao**, De-Hao Tsai (2017, Oct). Quantifying Surface Area of Nanosheet Graphene

Oxide Colloid Using a Gas-Phase Electrostatic Approach. *Analytical Chemistry*, 89 (22), 12217–12222.

17. Thai Phuong Nguyen, Wei-Chang Chang, Yen-Chih Lai, **Ta-Chih Hsiao**, De-Hao Tsai (2017, Aug). Quantitative characterization of colloidal assembly of graphene oxide-silver nanoparticle hybrids using aerosol differential mobility coupled mass analyses. *Analytical and Bioanalytical Chemistry*, 409:5933-5941.
18. Justin Chun-Te Lin, **Ta-Chih Hsiao***, Shu-San Hsiau, Da-Ren Chen, Yen-Kai Chen, Sheng-Hsiu Huang, Chih-Chieh Chen, Moo-Been Chang (2017, Jun). Effects of temperature, dust concentration, and filtration superficial velocity on the loading behavior and dust cakes of ceramic candle filters during hot gas filtration. *Separation and Purification Technology*, 198(8): 146-154.
19. **Hsiao, Ta-Chih***, Chuang, Hsiao-Chi, Chen, Chun-Wan, Cheng, Tsun-Jen, ChangChien, Ya-Chien (2017, Jan). Development and collection efficiency of an electrostatic precipitator for in-vitro toxicity studies of nano- and submicronsized aerosols. *Journal of the Taiwan Institute of Chemical Engineers*,
20. **Ta-Chih Hsiao***, Wei-Nai Chen,Wei-Cheng Ye, Neng-Huei Lin, Si-Chee Tsay, Tang-Huang Lin, Chung-Te Lee, Ming-Tung Chuang, Peter Pantina, Sheng-Hsiang Wang. (2016, Nov). Aerosol optical properties at the Lulin Atmospheric Background Station in Taiwan and the influences of long-range transport of air pollutants. *Atmospheric Environment*, 150, 366-378.