

Yeongkwon Son, Ph.D

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Organic Analytical Laboratory
Division of Atmospheric Sciences
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(a) Professional Preparation

Rutgers University, NJ, USA	Public Health	Ph.D.	2018
Konkuk University, Seoul, South Korea	Environmental science	Ph.D.	2012
Konkuk University, Seoul, South Korea	Rural engineering	B.S.	2007

(b) Appointments

Graduate Faculty	Environmental Science and Health University of Nevada, Reno, NV, USA	Oct 2022-Present
Associate Research Professor	Desert Research Institute, NV, USA	Jul 2022-Present
Graduate Faculty	Interdisciplinary Atmospheric Sciences University of Nevada, Reno, NV, USA	Mar 2020-Present
Assistant Research Professor	Desert Research Institute, NV, USA	Aug 2019-Jun 2022
Postdoctoral Fellow	Desert Research Institute, NV, USA	Jan 2018-Aug 2019

(c) Courses Taught

Introduction to Python for Atmospheric Science (UNR ATMS 415/615)	2021-Present
Environmental Exposure Assessment (UNR CHS 436/636, Guest Lecture)	Fall 2020
Data analysis with Python for atmospheric scientists (UNR ATMS 792)	Spring 2020

(d) Funded Projects

10. Exchange with Young Korean Climate Activists. Co-PI, DOS/NNIC, \$13,230	2022-2022
9. "Natural" and "organic": cigarette descriptors: association with expectancies, subjective effects, topography, and biomarkers of exposure among daily smokers. PI (subaward), NIH/NIDA, 1R01DA053619, \$458,574	2021-2024
8. Multi-parameter Investigation of Factors Controlling Carbonyl Emissions from Electronic Cigarettes. Co-PI, NIH/NIEHS 1R01ES033390, \$1,415,510	2021-2024
7. An Integrative Approach for Estimating Children's Soil and Dust Ingestion Rates, PI (subaward), EPA STAR RD840209, \$689,433	2021-2024
6. Development, Implementation and Evaluation of Stakeholder-Driven Wildfire Smoke Monitoring and Messaging in Rural Nevada, Co-PI, EPA STAR RD84023601, \$544,763	2021-2023
5. Informing the Management of Hot Springs in the Black Rock Desert-High Rock Canyon National Conservation Area: Microplastics, PFAS, and Aqueous geochemistry, Co-PI, DOI/BLM L21AC10477, \$30,491	2021-2022
4. Occurrence and Mass Balance of PFAS during Wastewater Treatment, Co-PI, USGS G16AP00069, \$106,930	2020-2021

3. Per- and polyfluoroalkyl substances (PFAS) in the southern Nevada watershed, Co-PI, MAKI Foundation, \$79,980 2019-2021
2. Development of a High-Throughput Electronic Cigarette Testing System, PI, Desert Research Foundation, \$34,882 2018-2019
1. Developing Analytical Methods for Nicotine Metabolites to Study Health Effects Associated with Electronic Cigarette Use, PI, DRI, \$10,257 2018-2019

(e) Publications

Peer-reviewed Journal Articles

23. **Son, Y.** and Khlystov, A. (2021) An Automated Aerosol Collection and Extraction System to Characterize Electronic Cigarette Aerosols. *Frontiers in Chemistry*, 9:764730
22. Zhang, T., Bhattarai, C., **Son, Y.**, Samburova, V., Khlystov, A., & Varganov, S. (2021) Reaction Mechanisms of Anisole Pyrolysis at Different Temperatures: Experimental and Theoretical Studies, *Energy & Fuels*, 35 (12), 9994–10008
21. Bai, X., & **Son, Y.** (2021). Perfluoroalkyl substances (PFAS) in surface water and sediments from two urban watersheds in Nevada, USA. *Science of The Total Environment*, 751, 141622
20. **Son, Y.**, Weisel, C., Wackowski, O., Schwander, S., Delnevo, C., & Meng, Q. (2020). The Impact of Device Settings, Use Patterns, and Flavorings on Carbonyl Emissions from Electronic Cigarettes. *International journal of environmental research and public health*, 17(16), 5650
19. **Son, Y.**, Giovenco, D. P., Delnevo, C., Khlystov, A., Samburova, V., & Meng, Q. (2020). Indoor Air Quality and Passive E-cigarette Aerosol Exposures in Vape-shops. *Nicotine & Tobacco Research*, ntaa094
18. Ebersole, J., Samburova, V., **Son, Y.**, Cappelli, D., Demopoulos, C., Capurro, A., Pinto, A., Chrzan, B., Kingsley, K., Howard, K. and Clark, N. (2020). Harmful chemicals emitted from electronic cigarettes and potential deleterious effects in the oral cavity. *Tobacco Induced Diseases*, 18
17. **Son, Y.**, Bhattarai, C., Samburova, V., & Khlystov, A. (2020). Carbonyls and Carbon Monoxide Emissions from Electronic Cigarettes Affected by Device Type and Use Patterns. *International journal of environmental research and public health*, 17(8), 2767
16. **Son, Y.**, Mainelis, G., Delnevo, C., Wackowski, O. A., Schwander, S., & Meng, Q. (2019). Investigating E-Cigarette Particle Emissions and Human Airway Depositions under Various E-Cigarette-Use Conditions. *Chemical Research in Toxicology*, 33(2), 343-352
15. **Son, Y.**, Mishin, V., Laskin, J. D., Mainelis, G., Wackowski, O. A., Delnevo, C., Schwander, S., Samburova, V., Khlystov, A., Meng, Q. (2019). Hydroxyl Radicals in E-cigarette Vapor and E-vapor Oxidative Potentials under Different Vaping Patterns. *Chemical research in toxicology*, 32(6), 1087-1095
14. **Son, Y.**, Weisel, C., Wackowski, O., Mainelis, G., Schwander, S., Delnevo, C., Kipen, H., Meng, Q. (2018). Evaluation of e-vapor nicotine and nicotine concentrations emitted under various e-liquid compositions, device settings and vaping topographies. *Chemical Research in Toxicology*, 31(9), 861-868
13. Samburova, V., Bhattarai, C., Strickland, M., Darrow, L., Angermann, J.E., **Son, Y.**, Khlystov, A. (2018). Aldehydes in exhaled breath during e-cigarette vaping: results of a pilot study. *Toxics*, 6(3), 46 (Best Paper Award)
12. **Son, Y.**, Osornio-Vargas, Á. R., O’Neill, M. S., Hystad, P., Texcalac-Sangrador, J. L., Ohman-Strickland, P., Meng, Q., Schwander, S. (2018). Land use regression models to assess air pollution exposure in Mexico City using finer spatial and temporal input parameters. *Science of The Total Environment*, 639, 40-48
11. Yoon, C.G., Rhee, H.P. & **Son, Y.*** (2017). Applicability study of ecological impact assessment using AQUATOX model in Paldang Reservoir, South Korea. *Desalination and Water Treatment*, 60, 39-47
10. Meng, Q., Nagarajan, S., **Son, Y.**, Koutsoupas, P., & Bielory, L. (2016). Asthma, ocular symptoms, and skin test sensitivity across National Health and Nutrition Examination Surveys. *Annals of Allergy*,

Asthma & Immunology, 116(2), 118-125

9. Meng, Q., Schwander, S., **Son, Y.**, Rivas, C., Delnevo, C., Graber, J., Giovenco, D., Bruen, U. & Robson, M. (2016). Has the mist been peered through? Revisiting the building blocks of human health risk assessment for electronic cigarette use. *Human and Ecological Risk Assessment: An International Journal*, 22(2), 558-579
8. **Son, Y.**, Rhee, H. P., Yoon, C. G., & Kwon, T. Y. (2016). Feasibility study of ecological wastewater treatment system for decentralized rural community in South Korea. *Desalination and Water Treatment*, 57(44), 20766-20773
7. Choi, J., Yoon, C. G., Rhee, H. P., **Son, Y.**, Cho, M., & Ryu, J. (2016). National risk assessment of irrigation on farmland near wastewater treatment plants in Korea. *Paddy and Water Environment*, 14(2), 281-288
6. **Son, Y.**, Mishin, V., Welsh, W., Lu, S. E., Laskin, J. D., Kipen, H., & Meng, Q. (2015). A Novel High-Throughput Approach to Measure Hydroxyl Radicals Induced by Airborne Particulate Matter. *International journal of environmental research and public health*, 12(11), 13678-13695
5. **Son, Y.K.**, Yoon, C.G., Rhee, H.P., & Lee, S.J. (2013). A review on microbial and toxic risk analysis procedure for reclaimed wastewater irrigation on paddy rice field proposed for South Korea. *Paddy and Water Environment*, 11(1-4), 543-550
4. Rhee, H.P., Yoon, C.G., Lee, S.J., Choi, J.H., & **Son, Y.K.** (2012). Analysis of nonpoint source pollution runoff from urban land uses in South Korea. *Environmental Engineering Research*, 17(1), 47-56
3. Rhee, H.P., Yoon, C.G., **Son, Y.K.**, & Jang, J.H. (2011). Quantitative risk assessment for reclaimed wastewater irrigation on paddy rice field in Korea. *Paddy and Water Environment*, 9(2), 183-191
2. **Son, Y.K.**, Yoon, C.G., Kim, H.C., Jang, J.H., & Lee, S.B. (2010). Determination of regression model parameter for constructed wetland using operating data. *Paddy and Water Environment*, 8(4), 325-332
1. Kim, H.C., Yoon, C.G., **Son, Y.K.**, Rhee, H.P., & Lee, S.B. (2010). Effects of open water on the performance of a constructed wetland for nonpoint source pollution control. *Water Science and Technology*, 62(5), 1003-1012

Conference Proceedings

18. **Son, Y.** and Cho, J. (2021) Current Trends in Air Quality Forecasting using a Machine Learning Technique, ICT-Advanced Engineering Society, International Conference on Advanced Engineering and ICT-Convergence: Seoul, Korea, July 7, 2021-July 9, 2021
17. **Son, Y.**, Carranza, C., Torres, M., Black, K., Jones, L., Meng, Q., Osornio-Vargas, A., Schwander, S. (2021) Association Between Particle Load in Alveolar Macrophages and Air Pollution Particulate Matter Exposures in México City, A3175-A3175, American Thoracic Society, May 15, 2021-May 19, 2021
16. **Son, Y.**, Khlystov, A. Y., Samburova, V. (2020) Pilot Study on The Nicotine Metabolite Ratio Among Electronic Cigarette Users, Society For Research On Nicotine and Tobacco 26th annual meeting: New Orleans, Louisiana, March 11, 2020-March 14, 2020, Poster No. PS5-155
15. **Son, Y.** and Ryu, J. (2019) Development of low-cost autonomous air quality sensing platform to access health impacts associated with wildfire events. Proceedings of Nevada Public Health Association annual conference, Reno, NV, USA
14. **Son, Y.**, Bhattarai, C., Samburova, V., and Khlystov, A. (2019). Impact of Vaping Patterns on Carbonyls and Carbon Monoxide Emissions from Four Popular Types of Electronic Cigarettes. Proceedings of Society of Research on Nicotine & Tobacco annual meeting, San Francisco, CA, USA
13. **Son, Y.**, Khlystov, A., Samburova, V., Al-Shujairi, A., Giovenco, D., Delnevo, C., and Meng, Q. (2019) Passive Nicotine Exposures in Electronic Cigarette Vape Shops in New Jersey, USA. Proceedings of Society of Research on Nicotine & Tobacco annual meeting, San Francisco, CA, USA
12. **Son, Y.**, Bhattarai, C., Samburova, V., Meng, Q., Wackowski, A, Delnevo, C., and Khlystov, A. (2019).

Estimating the Human Health Risks Induced by Harmful Chemical Exposures from Four Types Electronic Cigarettes. Proceedings of Society of Research on Nicotine & Tobacco annual meeting, San Francisco, CA, USA

11. Khlystov, A., Son, Y., Samburova, V., and Bhattarai, C. (2019). Characterization of nicotine, aldehyde, and carbon monoxide emissions from four types of electronic cigarette devices. Proceedings of American Chemical Society annual meeting, Orlando, FL, USA
10. Son, Y., Samburova, V., and Khlystov, A. (2018). Carbon Monoxide and Carbonyl Emissions from Four Popular E-cigarettes. Proceedings of Nevada Public Health Association annual meeting, Las Vegas, NV, USA
9. Samburova, V., Son, Y., Bhattarai, C., Strickland, M., Darrow, L., Angermann, J.E., and Khlystov, A. (2018). Aldehydes in exhaled breath during e-cigarette vaping: results of a pilot study. Invited Speaker at Nevada Tobacco Prevention Coalition Regular Meeting
8. Pearson, J.L., Crabtree, M.B., Maloney, S.F., Hiler, M., Spindle, T., Kilgalen, B., Nareg, K., Son, Y., Samburova, V., Khlystov, K., Eissenberg, T. (2018) A comparison of e-cigarette nicotine aerosol content vs blood nicotine concentrations: Markten vs. e-Go T. Proceedings of Tobacco Regulatory Science annual conference
7. Al-Shujairi, A., Son, Y., Meng, Q., Giovenco, D., Delnevo, C. (2018) Indoor Air Quality in Electronic Cigarette Vape Shops. Proceedings of Society of Research on Nicotine & Tobacco annual meeting, Baltimore, MD, USA, POS5-5
6. Son, Y., Osornio-Vargas, A. R., O'Neill, M., Texcalac-Sangrador, J. L., Ohman-Strickland, P. A., Meng, Q., Torres, M. & Schwander, S. (2017) A Novel Land Use Regression Model to Assess Air Pollution Exposure for Tuberculosis Research in Mexico City Using Finer Spatial and Temporal Input Parameters. Proceedings of American Thoracic Society International Conference, Washington DC, USA. American Journal of Respiratory and Critical Care Medicine, 195:A3908.
5. Meng, Q., Son, Y., Kipen, H., Laskin, D., Schwander, S., Delnevo, C. (2017) Particles Released from Primary E-Cigarette Vaping: Particle Size Distribution and Particle Deposition in the Human Respiratory Tract. Proceedings of American Thoracic Society International Conference, Washington DC, USA. American Journal of Respiratory and Critical Care Medicine, 195:A1023.
4. Son Y.K., C.G. Yoon, H.C. Kim, J.H. Jang. (2009) Development of Regression and Design Model for Constructed Wetland System using Performance Data. Proceedings of 13th international conference on diffuse pollution and integrated watershed management, Seoul, Korea, pp 27-28
3. Son Y.K., C.G. Yoon, H.P. Rhee, H.C. Kim. (2009) A Health-risk Analysis Procedure for Reclaimed Wastewater Irrigation in Paddy Rice Field. Proceedings of 7th IWA World Congress on Water Reclamation and Reuse, Brisbane, Australia, pp. 87
2. Son Y.K., C.G. Yoon, J.H. Jeon, J.H. Jang. (2008) Effect of Subwatershed Size on the BOD Loading Estimate in Hydrological Simulation Program-Fortran Simulation. Proceedings of 12th international conference on integrated diffuse pollution management, Khon Kaen, Thailand
1. Son Y.K., C.G. Yoon, T.Y. Kwun, J.W. Son. (2008) The Performance and Analysis of Natural and Ecological Wastewater Treatment System. Proceedings of 1st Asia-Pacific young water professional conference, Gwangju, Korea, pp71-72

(f) Technical Reports/Book Chapters

2. Wang, X., Firouzkouhi, H., Claassen, M., Bingham, B., Gronstal, S. B., Kohl, S. D., Rhode, D. E., Son, Y., Chow, J. C., Watson, J. G., Kumar, N., 2020: Virus Transport and Mitigation in Offices and Classrooms, Desert Research Institute: Reno, NV, Prepared for Nevada Governor's Office of Economic Development
1. Wang, X., Firouzkouhi, H., Claassen, M., Bingham, B., Gronstal, S. B., Kohl, S. D., Rhode, D. E., Son, Y., Moosmüller, H., Chow, J. C., Watson, J. G., Kumar, N., 2020: Virus Transport and Mitigation in Public

Transit Buses, Desert Research Institute: Reno, NV, Prepared for Nevada Governor's Office of Economic Development

(g) Professional Organizations

International Society of Exposure Science
Society for Research on Nicotine & Tobacco
Society of Environmental Toxicology and Chemistry
Nevada Tobacco Prevention Coalition
Korean-American Scientists and Engineers Association
Korea Engineering and Consulting Association

(h) Education, Scholarship, and Service

- Group coordinator at Korean American Scientists and Engineers Association (KSEA) iDrone online camp for 6th-12th students, 2020-Present
- Sabbatical committee, Desert Research Institute, 2022-Present
- Faculty senate, Desert Research Institute, 2021-Present
- Early Career Faculty committee, Desert Research Institute, 2021-Present
- Curriculum committee, Atmospheric Sciences program, University of Nevada, Reno, 2021-Present
- Science booth exhibition at "May Science Be with You" DRI open house event (5/15/2019)

(i) Professional Service

- Review Editor, Frontiers in Oral Health (ISSN 2673-4842), 2022-Present
- Topic Editor, Atmosphere (ISSN 2073-4433; CODEN: ATMOCZ), 2020-Present
- Guest Editor, Toxics (ISSN 2305-6304; CODEN: TOXIC8), Special Issue "Speciation, Characterization, and Quantitative Analysis of Toxic Organic Species in Indoor Air."

(j) Undergraduate/Graduate Mentorship

Undergraduate Supervisor

1. Mathew J Thomas, UNR School of Medicine, 2021-2022

Graduate Advising Committee

2. Bianca Martinez, UNR Atmospheric Sciences Graduate Program, MS student, expected to graduate in 2023
1. Camilo Andres Pena Bello, UNR College of Agriculture, Biotechnology & Natural Resources, PhD student, expected to graduate in 2023