

# Curriculum Vitae

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## **Academic Position**

**Jan. 2024 – Present, University of Alberta, Edmonton, AB**

- Position: Assistant Professor in Environmental Engineering
- Taught courses: N/A
- Research interest: health effect of atmospheric pollutants

**Mar. 2022 – Jul. 2023: University of California Davis, Davis, CA**

- Position: Postdoctoral Scholar in Air Quality Research Center
- Research interest: developing a novel instrument for assessing volatile organic compound in vineyards

## **Education**

**Jun. 2016 – May 2022, University of Illinois Urbana-Champaign, Urbana, IL**

- Ph.D. in Environmental Engineering in Civil Engineering
- Advisor: Dr. Vishal Verma
- Major academic course highlights: Air Quality Modeling, Aerosol Sampling and Measurements, Public Health Engineering, Atmospheric Chemistry, Indoor Environmental Control (GPA: 3.91/4.0)
- Thesis title: Connecting Acellular Oxidative Potential (OP) with Chemical Composition and Emission Sources of Ambient Fine Particulate Matter (PM<sub>2.5</sub>) in the Midwestern US

**Aug. 2014 – Aug. 2016, University of Florida, Gainesville, FL**

- M.S. in Environmental Engineering Sciences
- Advisor: Dr. Chang-Yu Wu
- Major academic course highlights: Air Pollution Control Design, Foundation of Air Pollution, Aerosol Mechanics, Atmospheric Chemistry and Physics, Statistical Methods in Research (GPA: 3.96/4.0)
- Thesis title: Performance Evaluation of a Novel Device for Virus Aerosol Sampling - Batch Adiabatic-Expansion for Size Intensification by Condensation (BASIC)

**Sep. 2009 – Jun. 2013, South China University of Technology, Guangzhou, China**

- B.S. in Applied Chemistry
- Advisor: Dr. Huiyu Song
- Major academic course highlights: Inorganic Chemistry, Organic Chemistry, Analytical Chemistry, Physical Chemistry, Principle of Chemical Engineering, Chemical Engineering Design (Total GPA: 3.13/4.0, Upper-division GPA: 3.70/4.0)

## **Research Projects**

- Jan. 2023 – Present: Developing a Machine Learning Tool to Predict OP of PM<sub>2.5</sub> with its Chemical Composition
- Jan. 2023 – Present: Seasonal Variability in Sources and Chemical Composition: A Comparative Analysis of Mass and OP of PM<sub>2.5</sub> in Edmonton, AB
- Jan. 2023 – Present: Developing an Online/Offline Automated System for Assessing Multiple Reactive Oxygen Species (ROS) Activities of Aerosols
- Mar. 2022 – Aug 2023: Developing a Cross Flow – Ion Mobility Spectrometer (CF-IMS) for Measuring Volatile Organic Compounds (VOCs) and Semi-volatile Organic Compounds (SVOCs) emitted from Ripe Grapes affected by Wildfire in Vineyards in the Western US
- Jan. 2021 – May 2022: Source Apportionment of OP and Mass Concentrations of PM<sub>2.5</sub> in Midwest U.S.
- Dec. 2019 – Jan. 2021: Seasonal Variability of Mass Concentration and Oxidative Potential (OP) of Size-resolved Aerosol in Haining, China
- Jul. 2019 – May 2022: Connection of Chemical Characterization and OP of Humic-like Substances (HULIS) in Ambient PM<sub>2.5</sub> and Biomass Burning Aerosol
- Apr. 2019 – May 2021: Spatiotemporal Variability of PM<sub>2.5</sub> OP and mass concentrations in Midwest U.S.
- Jul. 2016 – Jan. 2021: Comparison of Oxidative Potential of Size-Resolved PM in Indoor Environment and Ambient Condition in an Unoccupied Residence
- Aug. 2017 – Nov. 2019: Design and Evaluation of Semi-Automated Multi-endpoint ROS-activity Analyzer (SAMERA) System for Evaluating the Oxidative Potential of Ambient Aerosols
- Jun. 2016 – Aug. 2017: The Interactions among Metals and Organic Species in Ambient Particulate Matter (PM) on ROS Generation
- Aug. 2014 – Jun. 2016: Size Amplification of Viral Aerosol by Batch Adiabatic-expansion for Size Intensification by Condensation (BASIC)
- Feb. 2013 – Jun. 2013: Integrated Analysis in Measuring the Quantity of the Main Constituents of Lithium Iron Phosphate in Lithium Ion Battery
- Mar. 2012 – Apr. 2013: Palladium Catalyzed Negishi Cross Coupling Reaction under Electrochemical Environment in Aqueous Phase

## **Publications**

1. **Yu, H.**, Wang, Y., Puthussery, J.V., and Verma, V. Source Apportionment of Acellular Oxidative Potential of Ambient PM<sub>2.5</sub> with Five Endpoints in the Midwest US. Plan to submit to *Journal of Hazardous Materials*.
2. Salana, S., **Yu, H.**, Dai, Z., Subramanian, P.S.G., Puthussery, J.V., Wang, Y., Singh, A., Pope, F., Lieva-Guzmán, M., Rastogi, N., Tripathi, S., Weber, R., 2024. Relationship among PM<sub>2.5</sub> mass, oxidative potential, and cellular toxicity across different continents. Submitted to *Nature Communications*.
3. Zhang, W., **Yu, H.**, Verma, V., and Laskin, A., 2022. Field Evidence for Enhanced Generation of Reactive Oxygen Species in Atmospheric Aerosol Containing Quinoline Components. *Atmospheric Sciences* in May 2022. DOI: [10.1016/j.atmosenv.2022.119406](https://doi.org/10.1016/j.atmosenv.2022.119406).
4. Wang, Y., Salana, S., **Yu, H.**, Puthussery, J.V., and Verma, V., 2022. On the Relative Contributions of Iron and Organic Compounds and their Interaction in Cellular Oxidative Potential of Ambient PM<sub>2.5</sub>. *Environmental Science and Technology Letters*. DOI: [10.1021/acs.estlett.2c00316](https://doi.org/10.1021/acs.estlett.2c00316).
5. **Yu, H.**, Puthussery, J.V., Wang, Y., and Verma, V., 2021. Spatiotemporal Variability in the Oxidative Potential of Ambient Fine Particulate Matter in Midwestern United States. *Atmospheric Chemistry and Physics*. DOI: [10.5194/acp-2021-376](https://doi.org/10.5194/acp-2021-376).

6. Wang, Y., Puthussery, J.V., **Yu, H.**, Liu, Y., Salana, S., and Verma, V., 2021. Sources of Cellular Oxidative Potential of Water-soluble Fine Ambient Particulate Matter in the Midwestern United States. *Journal of Hazardous Materials*. DOI: [10.1016/j.jhazmat.2021.127777](https://doi.org/10.1016/j.jhazmat.2021.127777).
7. Zeng, Y., **Yu, H.**, Zhao, H., Stephens, B., & Verma, V., 2021. Influence of Environmental Conditions on the Dithiothreitol (DTT)-based Oxidative Potential of Size-resolved Indoor Particulate Matter of Ambient Origin. *Atmospheric Environment*. DOI: [10.1016/j.atmosenv.2021.118429](https://doi.org/10.1016/j.atmosenv.2021.118429).
8. Wang, Y., Puthussery, J.V., **Yu, H.**, and Verma, V., 2020. Synergistic and Antagonistic Interactions Among Organic and Metallic Components of the Ambient Particulate Matter (PM) for the Cytotoxicity Measured by Chinese Hamster Ovary Cells. *Science of the Total Environment*. DOI: [10.1016/j.scitotenv.2020.139511](https://doi.org/10.1016/j.scitotenv.2020.139511).
9. **Yu, H.**, Puthussery, J.V., and Verma, V., 2019. A Semi-automated Multi-endpoint Reactive Oxygen Species Activity Analyzer (SAMERA) for Measuring the Oxidative Potential of ambient PM<sub>2.5</sub> aqueous extracts. *Aerosol Science and Technology*. DOI: [10.1080/02786826.2019.1693492](https://doi.org/10.1080/02786826.2019.1693492).
10. Wei, J., **Yu, H.**, Wang, Y., and Verma, V., 2018. Complexation of Iron and Copper in Ambient Particulate Matter and Its Effect on the Oxidative Potential Measured in a Surrogate Lung Fluid. *Environmental Science & Technology*. DOI: [10.1021/acs.est.8b05731](https://doi.org/10.1021/acs.est.8b05731).
11. **Yu, H.**, Wei, J., Cheng, Y., Subedi, K. and Verma, V., 2018. Synergistic and Antagonistic Interactions among the Particulate Matter Components in generating Reactive Oxygen Species based on the Dithiothreitol Assay. *Environmental Science & Technology*. DOI: [10.1021/acs.est.7b04261](https://doi.org/10.1021/acs.est.7b04261).
12. **Yu, H.**, Afshar-Mohajer, N., Theodore, A.D., Lednický, J.A., Fan, Z.H. and Wu, C.Y., 2018. An Efficient Virus Aerosol Sampler Enabled by Adiabatic Expansion. *Journal of Aerosol Science*. DOI: [10.1016/j.jaerosci.2018.01.001](https://doi.org/10.1016/j.jaerosci.2018.01.001).
13. Xiong, Q., **Yu, H.**, Wang, R., Wei, J., & Verma, V., 2017. Rethinking Dithiothreitol-Based Particulate Matter Oxidative Potential: Measuring Dithiothreitol Consumption versus Reactive Oxygen Species Generation. *Environmental Science & Technology*. DOI: [10.1021/acs.est.7b01272](https://doi.org/10.1021/acs.est.7b01272).

### **Presentations in Conferences**

1. Platform presenter: **Yu, H.**, Puthussery, J., Wang, Y., & Verma, V., Spatiotemporal Variability in the Oxidative Potential of Ambient Fine Particulate Matter in Midwestern United States. American Association for Aerosol Research 38<sup>th</sup> Annual Conference (virtual), October 18-22, 2021.
2. Platform presenter: **Yu, H.**, Puthussery, J., Wang, Y., & Verma, V., Development of a Semi-automated Multi-endpoint ROS Activity Analyzer (SAMERA) and its Application in Assessing Spatiotemporal Variability of PM<sub>2.5</sub> Oxidative Potential in Midwest USA. American Chemical Society Fall 2021 Conference, Atlanta, GA, August 22-25, 2021.
3. Platform presenter: **Yu, H.**, Puthussery, J., Wang, Y., Liu, Y., & Verma, V., Spatiotemporal Variability of Oxidative Potential (OP) of Water-Soluble PM<sub>2.5</sub> in Midwest U.S. American Association for Aerosol Research 38<sup>th</sup> Annual Conference (virtual), October 5-9, 2020.
4. Poster presenter: **Yu, H.**, Zhang, W., Hettiyadura, A., Verma, V., & Laskin, A., Synergistic Effect of Quinoline Constituents on Oxidative Potential of Ambient Humic-like Substances (HULIS). Pittcon Conference & Expo, Chicago, IL, March 1-5, 2020.
5. Poster presenter: **Yu, H.**, Puthussery, J., & Verma, V., A Comprehensive Assessment of the Spatiotemporal Variability of Oxidative Potential of Ambient PM<sub>2.5</sub> in Midwest U.S. using a Semi-Automated Multi-Endpoint ROS-Activity Analyzer (SAMERA). American Geophysical Union 100 Fall Meeting 2019, San Francisco, CA, December 9-13, 2019.
6. Poster presenter: **Yu, H.**, Puthussery, J., & Verma, V., A Comprehensive Assessment of the Spatiotemporal

- Variability of Oxidative Potential of Ambient PM<sub>2.5</sub> in Midwest U.S. using a Semi-Automated Multi-Endpoint ROS-Activity Analyzer (SAMERA). American Association for Aerosol Research 37<sup>th</sup> Annual Conference, Portland, OR, October 14-18, 2019 (**student poster award**).
7. Poster presenter: Zhang, W., **Yu, H.**, Hettiyadura, A., Verma, V., & Laskin, A., Synergistic Effect of Quinoline Constituents on Oxidative Potential of Ambient Humic-like Substances (HULIS). Turkey Run Analytical Chemistry Conference 2019, Marshall, IN, September 27-28, 2019.
  8. Platform presenter: **Yu, H.**, Puthussery, J., & Verma, V., A Semi-Automated Multi-Endpoint ROS Analyzer (SAMERA). International Aerosol Conference 2018, St. Louis, MO, September 2-7, 2018.
  9. Platform presenter (by Dr. Vishal Verma): **Yu, H.**, Zhao, H., Stephens, B., & Verma, V., Comparison of the Oxidative Potential of Size-segregated Aerosols of Ambient Origin in Indoor and Outdoor Environments. Indoor Air 2018, Philadelphia, PA, July 22-27, 2018.
  10. Platform presenter: **Yu, H.**, Wei, J., Cheng, Y., Subedi, K., & Verma, V., Synergistic and Antagonistic Interactions among the Particulate Matter (PM) Components in generating Reactive Oxygen Species (ROS). American Association for Aerosol Research 36<sup>th</sup> Annual Conference, Raleigh, NC, October 16-20, 2017.
  11. Poster presenter: **Yu, H.**, Zhao, H., Stephens, B., & Verma, V., Comparison of the Oxidative Potential of Size-segregated Aerosols of Ambient Origin in Indoor and Outdoor Environments. American Association for Aerosol Research 36<sup>th</sup> Annual Conference, Raleigh, NC, October 16-20, 2017.
  12. Platform presenter (presented by Dr. Chang-Yu Wu): **Yu, H.**, Wu, C., Afshar-Mohajer, N., Lednicky, J., Fan, H., Theodore, A., & Dong, L., Size Amplification and Viability Preservation of Aerosolized Virus by Batch Adiabatic-expansion for Size Intensification by Condensation (BASIC): Thesis Report. American Association for Aerosol Research 35<sup>th</sup> Annual Conference, Portland, OR, October 17-21, 2016.
  13. Poster presenter: **Yu, H.**, Wu, C., Afshar-Mohajer, N., Lednicky, J., Fan, H., Theodore, A., Size Amplification of Virus Aerosol by Batch Adiabatic-expansion for Size Intensification by Condensation (BASIC). Florida Air and Waste Management Association, Tallahassee, FL, October 24-25, 2015.
  14. Poster presenter: **Yu, H.**, Wu, C., Afshar-Mohajer, N., Lednicky, J., Fan, H., Theodore, A., Size Amplification of Virus Aerosol by Batch Adiabatic-expansion for Size Intensification by Condensation (BASIC). American Association for Aerosol Research 34<sup>th</sup> Annual Conference, Minneapolis, MN, October 12-18, 2015.

## **Patents**

1. Verma, V., **Yu, H.**, & Puthussery, J. Device and Method for Assessing Oxidative Potential of Ambient Particulate Matter. *U.S. Patent Application No. 17/204,158*, 2021.

## **Skills**

1. Software skills: Experienced in Solidworks, Microsoft Office, Origin, SPSS, GitHub, and Endnote.
2. Programming skills: Python (Packages: NumPy, Pandas, Matplotlib, Scikit-Learn, BeautifulSoup), R, MATLAB, Markdown, Git Bash.
3. Firmware skills: Raspberry Pi, Arduino, Environmental sensors, 3D Printing with FDM 3D printers.
4. Instrument skills: Sunset Lab EC/OC analyzer, Ion Chromatography (IC), High-Performance Liquid Chromatography (HPLC), Kloeht Control Automated Flow Pump system, Spectrophotometer and Spectrofluorometer, Inductively Coupled Plasma Mass Spectrometry (ICP-MS), HPLC-MS, GC-MS, Aerosol Mass Spectrometry (AMS), Ion Mobility Spectrometer (IMS).

## **Certificates**

1. Introduction to Git and GitHub (Authorized by Google; Offered through Coursera; Grade Achieved: 100%)
2. Neural Networks and Deep Learning (Authorized by DeepLearning.AI; Offered through Coursera; Grade Achieved: 98%)
3. Applied Machine Learning in Python (Authorized by University of Michigan; Offered through Coursera; Grade Achieved: 98.56%)
4. Applied Plotting, Charting, and Data Representation in Python (Authorized by University of Michigan; Offered through Coursera; Grade Achieved: 100%)
5. Introduction to Data Science in Python (Authorized by University of Michigan; Offered through Coursera; Grade Achieved: 92.75%)
6. Crash Course on Python (Authorized by Google; Offered through Coursera; Grade Achieved: 98.50%)
7. The Raspberry Pi Platform and Python Programming for the Raspberry Pi (Authorized by University of California Irvine; Offered through Coursera; Grade Achieved: 99.37%)
8. Interfacing with the Raspberry Pi (Authorized by University of California Irvine; Offered through Coursera; Grade Achieved: 99.37%)

## **Honors and Awards**

May 2023:	Finalist for Triple Ring STAIR Side-car Award
Sep. 2021:	American Association for Aerosol Research Registration Waiver Grant
Mar. 2020:	Chester P. Siess Award
Oct. 2019:	American Association for Aerosol Research Outstanding Student Poster Award
Sep. 2018:	International AFerosol Conference 2018 Travel Grant
Oct. 2017:	American Association for Aerosol Research Student Assistantship
Aug. 2015:	Dale Lundgren Air Resource Scholarship
May 2015:	Florida Air & Waste Management Association Scholarship

## **Activities in Academia**

Mar. 2023 – Present:	Active Reviewer of <i>American Chemical Society Journals</i> in Environmental Engineering and Sciences, Environmental Chemistry, and Public Health Fields
Jan. 2023 – Present:	Organizer of UC Davis Air Quality Chemistry & Physics Seminar Series 2023 (AQSS2023)
Jan. 2023 – Present:	Member of Chinese-American Professors in Environmental Engineering and Science (CAPEES) and CAPEES Student Chapter
Jun. 2017 – Present:	Research Mentor in Environmental Engineering (Mentees: Yilan Cheng, Huawei Zhang, Yiwen Zhang, Hao-Lin Fang)
May 2021 – May 2022:	Founding President of UIUC AAAR Student Chapter
Oct. 2019 – Present:	Student member of American Chemical Society
Dec. 2019 – Present:	Student member of American Geophysical Union
May 2019 – Jul. 2019:	Course Designer and Mentor for Worldwide Youth in Science and Engineering (WYSE) 2019 Summer Camp
Dec. 2018 – Present:	Reviewer of <i>Environmental Science &amp; Technology Letters</i>
Aug. 2015 – Present:	Student member of American Association for Aerosol Research
Aug. 2015 – Jun. 2016:	Student member of Air & Waste Management Association