CURRICULUM VITAE

CV SECTION 1: Employment History/Awards

NAME Christian L'Orange

ADDRESS
1374 Campus Delivery
Colorado State University
Fort Collins, CO 80523

PHONE
(970) 491 - 4702

EDUCATION

2014 Postdoctoral Fellow, Colorado State University

2013 PhD, Colorado State University

2009 MS, Colorado State University

2008 BS, Colorado State University

2014 Project Management Professional, Project Management Institute

2019 Professional Engineer, Colorado State Department of Regulatory Agencies.

ACADEMIC POSITIONS

(2019 – Present) Assistant Professor, Mechanical Engineering, Colorado State University

SABBATICALS

N/A

OTHER POSITIONS

(2014 – 2019) Research Scholar, Mechanical Engineering, Colorado State University

CURRENT JOB DESCRIPTION

If there has been a significant change in your job description during the past 5 years, please note. If you have a joint appointment, please list the workload distribution in each category for each department. The overall percent effort may not exceed 100%.

0 % Teaching 90 % Research/Creative Activity 10 % Service/Outreach 0 % Admin

HONORS AND AWARDS

(2022) Outstanding Researcher Award, Walter Scott, Jr. College of Engineering, Colorado State University.

(2021) Swift Award - AIHA Aerosol Technology Committee, Leith et al. (2021). "Design and performance of UPAS inlets for respirable and thoracic mass sampling" Journal of Occupational and Environmental Hygiene. 17(6):274–82.

(2019) K01 Career Development Award, CDC/NIH.

(2016) Editor's Choice, L'Orange, C., et al. "Simple, Low-Cost Sampler for Inhalable Aerosol." Annals of Occupational Hygiene, 60(2).

(2014) Cover Issue, Annals of Occupational Hygiene, 58(4).

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CV SECTION 2: Publications/Scholarly Record

EVIDENCE OF INCORPORATING DIVERSITY, EQUITY, INCLUSION, AND/OR SOCIAL JUSTICE (DEISJ) IN SCHOLARSHIP, RESEARCH, AND CREATIVE ARTISTRY

PUBLISHED WORKS

Refereed Journal Articles:

Citation History

	All	Since 2020
Citations	1831	1363
h-index	23	22
i10-index	39	36

***Papers related to DEISJ topics (e.g. biomass cookstoves and/or clean energy access) or research conducted in a social justice relevant community (e.g. developing world countries): 25**

****Papers with undergraduate researchers: 8**

1. Shilpak, K., **L'Orange, C** (2024) "Informed Decision-Making for Outdoor Air Pollution Monitoring Networks through Numerical Modeling of Solar Radiation." Environmental Science & Technology Letters (Currently under review, submitted Dec 2024)
2. **Rosen, Z., Long, M., Ford, B., Wendt, E.A., Cheeseman, M., Quinn, C., L'Orange, C., Volckens, J. and Pierce, J.R., (2024). Anthropomorphism and motivating participation in citizen science projects. Journal of Science CommunicationAd, 23(8), p.A04. **https://doi.org/10.22323/2.23080204**
3. Khan, M. B., **L'Orange, C**., Lim, C., Kwon, D., & Yalin, A. P. (2024). Open-Path Cavity Ring-Down Spectroscopy for Simultaneous Detection of Hydrogen Chloride and Particles in Cleanroom Environment. Sensors, 24(17), 5611. **https://doi.org/10.3390/s24175611**
4. *Witinok-Huber, R., Keller, K. P., Abimana, E., Ahishakiye, C., Chang, H. H., **L'Orange, C**., ... & Clark, M. L. (2024). Impact of randomly assigned "pay-as-you-go" liquefied petroleum gas prices on energy use for cooking: Experimental pilot evidence from rural Rwanda. Energy for Sustainable Development, 80, 101455. https://doi.org/10.1016/j.esd.2024.101455
5. Bekbulat, B., Agrawal, P., Allen, R.W., Baum, M., Boldbaatar, B., Clark, L.P., Galsuren, J., Hystad, P., **L'Orange, C**., Vakacherla, S. and Volckens, J., 2023. Application of an Ultra-Low-Cost Passive Sampler for Light-Absorbing Carbon in Mongolia. Sensors, 23(21), p.8977. https://doi.org/10.3390/s23218977
6. Young, B.N., Gallichotte, E.N., Zier, L.B., Dunn, J., Alnachoukati, O., Nudell, N., Dobos, K.M., **L'Orange, C**., Quinn, C., Ebel, G.D. and Henry, C.S., 2023. Versatile Technology for Tracking SARS-CoV-2 Bioshedding and Exposure in a Clinical-Care Setting. Environmental Science & Technology Letters, 10(11), pp.1103-1108. https://doi.org/10.1021/acs.estlett.3c00611
7. **Tanner, K., Good, K.M., Goble, D., Good, N., Keisling, A., Keller, K.P., **L'Orange, C**., Morton, E., Phillips, R. and Volckens, J., 2023. Large particle emissions from human vocalization and playing of wind instruments. Environmental Science & Technology, 57(41), pp.15392-15400. https://doi.org/10.1021/acs.est.3c03588
8. Tryner, J., Quinn, C., Molina Rueda, E., Andales, M.J., **L'Orange, C**., Mehaffy, J., Carter, E. and

Volckens, J., 2023. AirPen: A Wearable Monitor for Characterizing Exposures to Particulate Matter and Volatile Organic Compounds. Environmental Science & Technology, 57(29), pp.10604-10614. https://doi.org/10.1021/acs.est.3c02238

9. Sipich, J., **L'Orange, C.,** Volckens, J. and Yalin, A., 2023. In-Situ Elemental Composition Analysis of Large Inhalable Aerosol Using Laser Induced Breakdown Spectroscopy. Applied Spectroscopy, 77(3), pp.261-269. https://doi.org/10.1177/00037028221146

10. Molina Rueda, E., Carter, E., **L'Orange, C**., Quinn, C. and Volckens, J., 2023. Size-Resolved Field Performance of Low-Cost Sensors for Particulate Matter Air Pollution. Environmental Science & Technology Letters, 10(3), pp.247-253. https://doi.org/10.1021/acs.estlett.3c00030

11. **Wendt, E.A., Ford, B., Cheeseman, M., Rosen, Z., Pierce, J.R., Jathar, S.H., **L'Orange, C**., Quinn, C., Long, M., Mehaffy, J. and Miller-Lionberg, D.D., 2023. A national crowdsourced network of low-cost fine particulate matter and aerosol optical depth monitors: results from the 2021 wildfire season in the United States. Environmental Science: Atmospheres, 3(10), pp.1563-1575. https://doi.org/10.1039/D3EA00086A

12. *Kodros, J.K., Bell, M.L., Dominici, F., **L'Orange, C**., Godri Pollitt, K.J., Weichenthal, S., Wu, X. and Volckens, J., 2022. Unequal airborne exposure to toxic metals associated with race, ethnicity, and segregation in the USA. Nature Communications, 13(1), p.6329. https://doi.org/10.1038/s41467-022-33372-z

13. **Volckens, J., Good, K.M., Goble, D., Good, N., Keller, J.P., Keisling, A., **L'Orange, C**., Morton, E., Phillips, R. and Tanner, K., (2022). Aerosol emissions from wind instruments: effects of performer age, sex, sound pressure level, and bell covers. Scientific reports, 12(1), pp.1-9. https://doi.org/10.1038/s41598-022-15530-x

14. *Young, B.N., Good, N., Peel, J.L., Benka-Coker, M.L., Keller, J.P., Rajkumar, S., Walker, E.S., Volckens, J., **L'Orange, C**., Quinn, C. and Africano, S., (2022). Reduced Black Carbon Concentrations following a Three-Year Stepped-Wedge Randomized Trial of the Wood-Burning Justa Cookstove in Rural Honduras. Environmental Science & Technology Letters. https://doi.org/10.1021/acs.estlett.2c00098

15. *Benka-Coker, M.L., Clark, M.L., Rajkumar, S., Young, B.N., Bachand, A.M., Brook, R.D., Nelson, T.L., Volckens, J., Reynolds, S.J., Wilson, A. and **L'Orange, C**., (2022). Household air pollution from wood-burning cookstoves and C-reactive protein among women in rural Honduras. International Journal of Hygiene and Environmental Health, 241, p.113949. https://doi.org/10.1016/j.ijheh.2022.113949

16. Bond, Tami C., **L'Orange, C**., Medwell, P., Sizoomu, G., Abdelnour, S., Brinkmann, V., Lloyd, P., and Pemberton-Pigott, C. "A conceptual framework for evaluating cooking systems." Environmental Research Letters (2022). https://doi.org/10.1088/1748-9326/ac5418

17. Cheeseman, M., Ford, B., Rosen, Z., Wendt, E., DesRosiers, A., Hill, A.J., **L'Orange, C**., Quinn, C., Long, M., Jathar, S.H. and Volckens, J., 2021. Investigating sub-city gradients of air quality: lessons learned with low-cost PM 2.5 and AOD monitors and machine learning. Atmospheric Chemistry and Physics Discussions, pp.1-30. (Preprint) https://doi.org/10.5194/acp-2021-751

18. Good, N., Fedak, K. M., Goble, D., **Keisling, A., **L'Orange, C**., **Morton, E., ... & Volckens, J. 2021. Respiratory Aerosol Emissions from Vocalization: Age and Sex Differences Are Explained by Volume and Exhaled CO2. Environmental Science & Technology Letters, 8(12), 1071-1076. https://doi.org/10.1021/acs.estlett.1c00760

19. Sipich, J., **L'Orange, C**., Anderson, K., Limbach, C., Volckens, J., & Yalin, A. 2022. A direct-reading particle sizer with elemental composition analysis for large inhalable particles. Aerosol Science and Technology, 1-11. https://doi.org/10.1080/02786826.2021.2002255

20. Kodros, J. K., O'Dell, K., Samet, J. M., **L'Orange, C**., Pierce, J. R., & Volckens, J. 2021. Quantifying the health benefits of face masks and respirators to mitigate exposure to severe air pollution. GeoHealth, 5(9), e2021GH000482. https://doi.org/10.1029/2021GH000482

21. *Benka-Coker, M.L., Young, B.N., Keller, J.P., Walker, E.S., Rajkumar, S., Volckens, J., Good, N.,

Quinn, C., **L'Orange, C**., Weller, Z.D. and Africano, S., 2021. Impact of the wood-burning Justa cookstove on fine particulate matter exposure: A stepped-wedge randomized trial in rural Honduras. Science of The Total Environment, 767, p.144369. https://doi.org/10.1016/j.scitotenv.2020.144369

22. Wendt, E. A., Quinn, C., **L'Orange, C**., Miller-Lionberg, D. D., Ford, B., Pierce, J. R., ... & Volckens, J. 2021. A low-cost monitor for simultaneous measurement of fine particulate matter and aerosol optical depth–Part 3: Automation and design improvements. Atmospheric Measurement Techniques Discussions, 1-25. https://doi.org/10.5194/amt-14-6023-2021

23. Leith, D., **L'Orange, C**., & Volckens, J. 2021. Quantitative protection factors for common masks and face coverings. Environmental Science & Technology, 55(5), 3136-3143. https://doi.org/10.1021/acs.est.0c07291

24. **L'Orange, C**., **Neymark, G., Carter, E., & Volckens, J. 2021. A High-throughput, Robotic System for Analysis of Aerosol Sampling Filters. Aerosol and Air Quality Research, 21, 210037. https://doi.org/10.4209/aaqr.210037

25. *Cole-Hunter, T., Dhingra, R., Fedak, K.M., Good, N., **L'Orange, C**., Luckasen, G., Mehaffy, J., Walker, E., Wilson, A., Balmes, J. and Brook, R.D., 2021. Short-term differences in cardiac function following controlled exposure to cookstove air pollution: The subclinical tests on volunteers exposed to smoke (STOVES) study. Environment International, 146, p.106254. https://doi.org/10.1016/j.envint.2020.106254

26. *Benka-Coker, M.L., Young, B.N., Keller, J.P., Walker, E.S., Rajkumar, S., Volckens, J., Good, N., Quinn, C., **L'Orange, C**., Weller, Z.D. and Africano, S., 2020. Impacts of the wood-burning Justa cookstove on fine particulate matter exposure: a stepped-wedge randomized trial in rural Honduras. Science of The Total Environment, p.144369. https://doi.org/10.1016/j.scitotenv.2020.144369

27. *Walker ES, Fedak KM, Good N, Balmes J, Brook RD, Clark ML, Cole-Hunter T, Devlin RB, L'Orange C, Luckasen G, Mehaffy J. Acute differences in blood lipids and inflammatory biomarkers following controlled exposures to cookstove air pollution in the STOVES study. International Journal of Environmental Health Research. 2020 Aug 24:1-4. https://doi.org/10.1080/09603123.2020.1785402

28. *Walker, E.S., Fedak, K.M., Good, N., Balmes, J., Brook, R.D., Clark, M.L., Cole-Hunter, T., Dinenno, F., Devlin, R.B., **L'Orange, C**. and Luckasen, G., 2020. Acute differences in pulse wave velocity, augmentation index, and central pulse pressure following controlled exposures to cookstove air pollution in the Subclinical Tests of Volunteers Exposed to Smoke (SToVES) study. Environmental research, 180, p.108831. https://doi.org/10.1016/j.envres.2019.108831

29. *Benka-Coker, M.L., Peel, J.L., Volckens, J., Good, N., Bilsback, K.R., **L'Orange, C**., Quinn, C., Young, B.N., Rajkumar, S., Wilson, A. and Tryner, J., 2020. Kitchen concentrations of fine particulate matter and particle number concentration in households using biomass cookstoves in rural Honduras. Environmental Pollution, 258, p.113697. https://doi.org/10.1016/j.envpol.2019.113697

30. Tryner, J., **L'Orange, C**., Mehaffy, J., Miller-Lionberg, D., Hofstetter, J.C., Wilson, A. and Volckens, J., 2020. Laboratory evaluation of low-cost PurpleAir PM monitors and in-field correction using co-located portable filter samplers. Atmospheric Environment, 220, p.117067. https://doi.org/10.1016/j.atmosenv.2019.117067

31. Leith, D., **L'Orange, C**., Mehaffy, J. and Volckens, J., 2020. Design and performance of UPAS inlets for respirable and thoracic mass sampling. Journal of Occupational and Environmental Hygiene, pp.1-9. https://doi.org/10.1080/15459624.2020.1741595

32. Wilson, A., Tryner, J., **L'Orange, C**. and Volckens, J., 2020. Bayesian Nonparametric Monotone Regression. Environmetrics, p.e2642. https://doi.org/10.1002/env.2642

33. *Piedrahita, R., Johnson, M., Bilsback, K.R., **L'Orange, C**., Kodros, J.K., Eilenberg, S.R., Naluwagga, A., Shan, M., Sambandam, S., Clark, M. and Pierce, J.R., 2020. Comparing regional stove-usage patterns and using those patterns to model indoor air quality impacts. Indoor air, 30(3), pp.521-533. https://doi.org/10.1111/ina.12645

34. *Fedak, K.M., Good, N., Walker, E.S., Balmes, J., Brook, R.D., Clark, M.L., Cole-Hunter, T., Devlin, R.,

L'Orange, C., Luckasen, G. and Mehaffy, J., 2020. Acute changes in lung function following controlled exposure to cookstove air pollution in the subclinical tests of volunteers exposed to smoke (STOVES) study. Inhalation toxicology, 32(3), pp.115-123. https://doi.org/10.1080/08958378.2020.1751750

35. *Bilsback, K.R., **Dahlke, J., Fedak, K.M., Good, N., Hecobian, A., Herckes, P., **L'Orange, C**., Mehaffy, J., Sullivan, A., Tryner, J. and Van Zyl, L., 2019. A laboratory assessment of 120 air pollutant emissions from biomass and fossil fuel cookstoves. Environmental science & technology, 53(12), pp.7114-7125. https://doi.org/10.1021/acs.est.8b07019

36. Ford, B., Pierce, J.R., Wendt, E., Long, M., Jathar, S., Mehaffy, J., Tryner, J., Quinn, C., van Zyl, L., **L'Orange, C**. and MillerLionberg, D., 2019. A low-cost monitor for measurement of fine particulate matter and aerosol optical depth–Part 2: Citizen-science pilot campaign in northern Colorado. Atmospheric Measurement Techniques, 12(12). https://doi.org/10.5194/amt-12-6385-2019

37. Wendt, E.A., Quinn, C.W., Miller-Lionberg, D.D., Tryner, J., **L'Orange, C**., Ford, B., Yalin, A.P., Pierce, J.R., Jathar, S. and Volckens, J., 2019. A low-cost monitor for simultaneous measurement of fine particulate matter and aerosol optical depth–Part 1: Specifications and testing. Atmospheric Measurement Techniques, 12(10), pp.5431-5441. https://doi.org/10.5194/amt-125431-2019

38. *Cole-Hunter, T., Fedak, K., Good, N., **L'Orange, C**., Mehaffy, J., Walker, E., Wilson, A., Clark, M., Volckens, J. and Peel, J., 2019. Acute changes in heart rate variability and cardiac repolarization following controlled exposure to cookstove air pollution: the Subclinical Tests of Volunteers Exposed to Smoke (STOVES) study. Environmental Epidemiology, 3, pp.306-307. 10.1097/01.EE9.0000609336.59567.98

39. *Fedak, K.M., Good, N., Walker, E.S., Balmes, J., Brook, R.D., Clark, M.L., Cole-Hunter, T., Devlin, R., **L'Orange, C**., Luckasen, G. and Mehaffy, J., 2019. Acute effects on blood pressure following controlled exposure to cookstove air pollution in the STOVES Study. Journal of the American Heart Association, 8(14), p.e012246. https://doi.org/10.1161/JAHA.119.012246

40. Lee, E.G., Grimson, P.J., Chisholm, W.P., Kashon, M.L., He, X., **L'Orange, C**. and Volckens, J., 2019. Performance evaluation of disposable inhalable aerosol sampler at a copper electrorefinery. Journal of occupational and environmental hygiene, 16(3), pp.250-257. https://doi.org/10.1080/15459624.2019.1568444

41. *Young, B.N., Peel, J.L., Benka-Coker, M.L., Rajkumar, S., Walker, E.S., Brook, R.D., Nelson, T.L., Volckens, J., **L'Orange, C**., Good, N. and Quinn, C., 2019. Study protocol for a stepped-wedge randomized cookstove intervention in rural Honduras: household air pollution and cardiometabolic health. BMC public health, 19(1), p.903. https://doi.org/10.1186/s12889-019-7214-2

42. *Rajkumar, S., Young, B.N., Clark, M.L., Benka-Coker, M.L., Bachand, A.M., Brook, R.D., Nelson, T.L., Volckens, J., Reynolds, S.J., **L'Orange, C**. and Good, N., 2019. Household air pollution from biomass-burning cookstoves and metabolic syndrome, blood lipid concentrations, and waist circumference in Honduran women: a cross-sectional study. Environmental research, 170, pp.46-55. https://doi.org/10.1016/j.envres.2018.12.010

43. *Walker, E.S., Clark, M.L., Young, B.N., Rajkumar, S., Benka-Coker, M.L., Bachand, A.M., Brook, R.D., Nelson, T.L., Volckens, J., Reynolds, S.J., **L'Orange, C**., and Peel, J. 2020. Exposure to household air pollution from biomass cookstoves and self-reported symptoms among women in rural Honduras. International Journal of Environmental Health Research, 30(2), pp.160-173. https://doi.org/10.1080/09603123.2019.1579304

44. *Young, B.N., Clark, M.L., Rajkumar, S., Benka-Coker, M.L., Bachand, A., Brook, R.D., Nelson, T.L., Volckens, J., Reynolds, S.J., **L'Orange, C**. and Good, N., 2019. Exposure to household air pollution from biomass cookstoves and blood pressure among women in rural Honduras: A cross-sectional study. Indoor air, 29(1), pp.130-142. https://doi.org/10.1111/ina.12507

45. *Eilenberg, S.R., Bilsback, K.R., Johnson, M., Kodros, J.K., Lipsky, E.M., Naluwagga, A., Fedak, K.M., Benka-Coker, M., Reynolds, B., Peel, J. and Clark, M. **L'Orange, C**., and Robinson, A., 2018. Field measurements of solid-fuel cookstove emissions from uncontrolled cooking in China, Honduras, Uganda, and India. Atmospheric Environment, 190, pp.116-125. https://doi.org/10.1016/j.atmosenv.2018.06.041

46. Saliba, G., Subramanian, R., Bilsback, K., **L'Orange, C**., Volckens, J., Johnson, M. and Robinson, A.L., 2018. Aerosol Optical Properties and Climate Implications of Emissions from Traditional and Improved Cookstoves. Environmental Science & Technology, 52(22), pp.13647-13656. https://doi.org/10.1021/acs.est.8b05434

47. Benka-Coker, M.L., Clark, M.L., Rajkumar, S., Young, B.N., Bachand, A.M., Balmes, J.R., Brook, R., Nelson, T.L., Volckens, J., Reynolds, S.J., Wilson, A., **L'Orange, C**., and Peel, J. 2018. Exposure to Household Air Pollution from Biomass Cookstoves and Levels of Fractional Exhaled Nitric Oxide (FeNO) among Honduran Women. International journal of environmental research and public health, 15(11), p.2544. https://doi.org/10.3390/ijerph15112544

48. Bilsback, K.R., Eilenberg, S.R., Good, N., Heck, L., Johnson, M., Kodros, J.K., Lipsky, E.M., **L'Orange, C**., Pierce, J.R., Robinson, A.L. and Subramanian, R., 2018. The Firepower Sweep Test: A novel approach to cookstove laboratory testing. Indoor air, 28(6), pp.936-949. https://doi.org/10.1111/ina.12497

49. Rajkumar, S., Clark, M.L., Young, B.N., Benka-Coker, M.L., Bachand, A.M., Brook, R.D., Nelson, T.L., Volckens, J., Reynolds, S.J., **L'Orange, C**. and Good, N., 2018. Exposure to household air pollution from biomass-burning cookstoves and HbA1c and diabetic status among Honduran women. Indoor air, 28(5), pp.768-776. https://doi.org/10.1111/ina.12484

50. Kodros, J.K., Carter, E., Brauer, M., Volckens, J., Bilsback, K.R., **L'Orange, C**., Johnson, M. and Pierce, J.R., 2018. Quantifying the contribution to uncertainty in mortality attributed to household, ambient, and joint exposure to PM2. 5 from residential solid fuel use. GeoHealth, 2(1), pp.25-39. https://doi.org/10.1002/2017GH000115

51. *Garland, C., Delapena, S., Prasad, R., **L'Orange, C**., Alexander, D. and Johnson, M., 2017. Black carbon cookstove emissions: A field assessment of 19 stove/fuel combinations. Atmospheric Environment, 169, pp.140-149. https://doi.org/10.1016/j.atmosenv.2017.08.040

52. **L'Orange, C**., Anderson, K., Sleeth, D., Anthony, T.R. and Volckens, J., 2016. A simple and disposable sampler for inhalable aerosol. Annals of Occupational Hygiene, 60(2), pp.150-160. https://doi.org/10.1093/annhyg/mev065

53. Good, N., Mölter, A., Ackerson, C., Bachand, A., **Carpenter, T., Clark, M.L., Fedak, K.M., Kayne, A., Koehler, K., Moore, B. and **L'Orange, C**., 2016. The Fort Collins Commuter Study: Impact of route type and transport mode on personal exposure to multiple air pollutants. Journal of exposure science & environmental epidemiology, 26(4), pp.397-404. https://doi.org/10.1038/jes.2015.68

54. ***L'Orange, C**., Leith, D., Volckens, J. and DeFoort, M., 2015. A quantitative model of cookstove variability and field performance: Implications for sample size. biomass and bioenergy, 72, pp.233-241. https://doi.org/10.1016/j.biombioe.2014.10.031

55. *Kodros, J.K., Scott, C.E., Farina, S.C., Lee, Y.H., **L'Orange, C**., Volckens, J. and Pierce, J.R., 2015. Uncertainties in global aerosols and climate effects due to biofuel emissions. Atmospheric Chemistry and Physics, 15, pp.8577-8596. http://dx.doi.org/10.5194/acp-15-8577-2015

56. Hawley, B., **L'Orange, C**., Olsen, D.B., Marchese, A.J. and Volckens, J., 2014. Oxidative stress and aromatic hydrocarbon response of human bronchial epithelial cells exposed to petro-or biodiesel exhaust treated with a diesel particulate filter. Toxicological Sciences, 141(2), pp.505-514. https://doi.org/10.1093/toxsci/kfu147

57. Cate, D.M., Nanthasurasak, P., Riwkulkajorn, P., **L'Orange, C**., Henry, C.S. and Volckens, J., 2014. Rapid detection of transition metals in welding fumes using paper-based analytical devices. Annals of occupational hygiene, 58(4), pp.413-423. https://doi.org/10.1093/annhyg/met078

58. ***L'Orange, C**., DeFoort, M. and Willson, B., 2012. Influence of testing parameters on biomass stove performance and development of an improved testing protocol. Energy for Sustainable Development, 16(1), pp.3-12. https://doi.org/10.1016/j.esd.2011.10.008

Other (e.g., lab texts, book reviews, technical reports, in-house reports):
Contributing author to three ISO technical documents (ISO/TR 21276:2018, ISO 19867-1:2018, and ISO 19867-

3:2018) and two additional document in progress (ISO/AWI 5714 and ISO/AWI TR 7288)

CONTRACTS & GRANTS

Externally-Funded Projects as PI or CoPI

(2024 – 2025); "PM2.5 Metals, Oxidative Potential, Exposure, and Risk Assessment (PM OPERA): A National Morbidity and Mortality Study;" Primary PI: Volckens; CoPI: L'Orange; NIH National Institutes of Heath; $676,077.00. *Role:* Lead of development and deployment of data management system and overview of technical design of sampler systems.

(2022 – 2026); "LEAP-HI: Systemic, Anthro-centric Packages for Protecting Households In Realistic Exposure Situations (SAPPHIRES);" Primary PI: Bond; CoPI: **L'Orange**; NSF-National Science Foundation; $1,999,998.00. *Role*: I am leading one of the project aims/objectives. This includes oversight of graduate and undergraduate students.

(2022 – 2025); "Structural Fires at the Wildland Urban Interface: Emission Factors, Inventories, and Implications;" Primary PI: Jathar; CoPI: **L'Orange**; DOC-NOAA-Natl Oceanic and Atmospheric Admn; $749,640.31. *Role*: I am leading the execution of the experimental aspects of the project. This includes oversight of graduate and undergraduate students.

(2022 – 2025): "REU Site: Airborne Connections - From Emission Source to Impact to Solution;" Primary PI: Bond; CoPI: **L'Orange**; NSF-National Science Foundation; $404,994.69. *Role*: We are taking a team approach to leading this REU program. This includes me preparing some of the training content, acting as a mentor to undergraduate interns, and coordinating REU activities.

(2020 – 2025); "Aerosol Filter Analysis Related Services for Jet Propulsion Laboratories;" PI:. **L'Orange**; Co-PI: Volckens, Sullivan; California Institute of Technology/Jet Propulsion Lab; $489,148.00.

(2019 – 2023); "A Novel Approach of Quantifying Real-Time Aerosol Concentrations from Gravimetric Filter Collection;" PI: **L'Orange**; HHS-CDC-Centers for Disease Control; $324,000.00. One first author publication to date.

(2020 – 2023); "Advancing Sustainable Household Energy Solutions (ASHES);" Primary PI: Volckens; CoPI: **L'Orange**; Environmental Protection Agency; $250,000.00. *Role*: We are taking a team approach to this project. I am leading the organization and execution of webinar and acting as the technical lead for the project.

(2021 – 2022); "Testing of Haitian Cookstoves;" PI: **L'Orange**; The United Nations Foundation; $64,379.00.

(2016 – 2017); "A Novel, Low-Cost Method for Assessing Personal Aerosol Exposures in Real-Time;" PI: **L'Orange**; HHS-CDC-Centers for Disease Control; $19,671.00. This work lead to a K01 award and $324,000 of additional funding.

Externally-Funded Projects as Investigator or role other than PI or CoPI

(2019 – 2025); "Sustainable Household Energy Adoption in Rwanda (SHEAR): Promoting Rural Health with Solar and Gas;" Primary PI: Volckens; *Role*: Leading development efforts of aerosol sampling technologies used in study; training of postdoc and field team with regards to field sampling methods, overseeing the analysis of field-collected samples, and providing mentorship to graduate students on laboratory and field best practices; HHS-NIH-National Institutes of Health; $2,010,726.00.

(2017 – 2022); "Citizen-Enabled Aerosol Measurements for Satellites: A network for High-Resolution Measurements of PM2.5 and Aerosol Optical Depth;" Primary PI: Volckens; *Role*: Leading development efforts of aerosol sampling technologies used in study, overseeing the analysis of field-collected samples, providing mentorship to graduate students related to design for manufacturing and method validation, substantial contribution to the preparation and reviewing of manuscripts (4 publications to date); National Aeronautics and Space Administration; $1,850,137.34.

(2018 – 2021); "A Direct-Reading Inhalable Particle Sizer with Elemental Composition Analyzer;" Primary PI: Yalin; *Role*: Mentoring of the graduate student in laboratory best practices and experimental design, reviewing of technical writing, substantial contribution to the preparation and reviewing of manuscripts (1 publication to date, 1 in development); HHS-CDC-Centers for Disease Control; $371,131.20.

(2014 – 2020); "Cookstove Air Pollution: Emission Profiles and Subclinical Effects of Exposure;" Primary PI:

Peel; *Role*: Lead the development of personal exposure chamber, mentoring of undergraduate students completing a senior design project, oversite of the testing facility on testing days while conducting controlled personal exposure measurements, substantial contribution to the preparation and reviewing of manuscripts (6 publications to date); HHS-NIH-Natl Inst of Environ Health Serv; $2,895,357.00

Externally-Funded Pending Projects as PI or CO-PI

(2025 – 2028); "REU Site: Airborne Connections - From Emission Source to Impact to Solution;" Primary PI: **L'Orange**; NSF-National Science Foundation; $460,046.00. *Role*: We are taking a team approach to leading this REU program. This includes me preparing some of the training content, acting as a mentor to undergraduate interns, and coordinating REU activities. (Pending scoring)

(2025 – 2026); "RAPID: Rapid Assessment of Air Quality During Wildland-Urban Interface Fires in Southern California." PI: Jathar; **Role: CoPI** Overseeing of filter preparation and analysis and linking of data to laboratory experiments; NSF- National Science Foundation $126,709.49. (Recommended for funding)

Externally-Funded Pending Projects as Investigator or role other than PI or CO-PI

(2025 – 2026); "High-Throughput Automated Air Sample Analysis Platform for Exposomics and Precision Environmental Health Research." PI: Volckens; *Role*: If funded – will lend expertise in the design and implementation of this system based on the success of a system that I designed and is currently used by the cost center I manage; Subaward of Access Sensor Technologies from NIH-National Institutes of Health; $45,000.00. (Highly scored, awaiting notification of award).

(2025 – 2029); "Mountain West ACE-CH Hub: Phase II." PI: Volckens; Role: If funded – will lead the development of a data management platform that allows for real-time data processing and quality assurance checks as data is streamed to the server. Subaward of the University of Colorado Anschutz Medical Campus from NIH-National Institutes of Health; $1,379,080.03 (Pending scoring).

(2025 – 2030); "PM2.5 Metals, Oxidative Potential, Exposure, and Risk Assessment (PM OPERA): A National Morbidity and Mortality Study;" Primary PI: Volckens; CoPI: L'Orange; *Role:* Led development and deployment of the data management system and overview of the technical design of sampler systems. This is the full funding for a project that is currently receiving funding for the first year; $3,838,291.00; NIH National Institutes of Heath; (Highly scored, awaiting notification of award)

(2025 – 2027); "SMASH: Situational awareness with Mobile Air Sampling for Hazards"; Primary PI: Volckens. *Role*: Leading the integration of cellular capabilities into a sampling system. Colorado Office of Economic Development and Intl Trade. $180,000.00. (**Awarded, awaiting funding**)

(2025); AirPen: A Wearable Sampler for Airborne Hazards in support of Disaster Response Research; Primary PI: Volckens. *Role*: Will provide technical guidance in the design and validation of new technology in preparation of commercialization of this technology; $75,000.00; NIH-Natl Inst of Environ Health Serv (**Awarded, awaiting funding**)

Internally-Funded Awards

(2017 - Current) Center for Energy Development and Health; Fee-for-service testing center; $628,600 (to date).

PAPERS PRESENTED/ SYMPOSIA/ INVITED LECTURES/ PROFESSIONAL MEETINGS/ WORKSHOPS

Invited

1. October 21, 2024 Taner, K., Clark, M., Cleveland, V., Kalisa, E., **L'Orange, C.,** Mori, R., Ntakirutimana, T., Quinn, C., Sewor, C., Slater, K., Tryner, J., Volcken, J. "Microenvironmental Apportionment Explains Demographic Differences in PM2.5 Exposure within a Rural Rwandan Biomass Burning Community" 42 American Association of Aerosol Research. Albuquerque, NM.
2. October 21, 2024 Haseheminassab, S., Diner, D., Blair, J., Dillner, A., Liu, Y, **L'Orange, C.,** Martin, R., Oxford, C., Sarnat, J. "Status Update and Preliminary Results from the Ground-Based Particulate Matter Monitoring Network of the Multi-Angle Imager for Aerosols (MAIA) Investigation." 42 American Association of Aerosol

Research. Albuquerque, NM.

3. October 21, 2024 Probsdorfer, J., Macqueene, E., Kodros, J., **L'Orange, C.,** Volckens, J."A Beta Attenuation System for Mass Determination of Filter-Based Aerosol Samples" 42 American Association of Aerosol Research. Albuquerque, NM.
4. October 21, 2024 Dresser, W., Jathar, S., **L'Orange, C.,** de Gouw, J. "Investigation of VOC Emissions and Retention from Wildland Urban Interface Fires." 42 American Association of Aerosol Research. Albuquerque, NM.
5. October 21, 2024 Ridgway, K., Helfrich, A., Cast, J., Medina, C., Trujillo, M., **L'Orange, C.**, Jathar, S., "Aerosol Emissions from Structural Fires at the Wildland-Urban Interface: From Carpets to Couches and Shingles to Studs." 42 American Association of Aerosol Research. Albuquerque, NM.
6. October 21, 2024 Xie, Q., Hopstock, K., Ridgeway, K., Cast, J., Jathar, S., Laskin, A., **L'Orange, C.,** Nizkorodov, S., Ruiz Armenta, L., "Molecular Composition, Absorption, and Oxidative Potential of Urban Burning Aerosols." 42 American Association of Aerosol Research. Albuquerque, NM.
7. August 28, 2024 Sewor, C., Young, B.N., Benka Coker, M., Walker, E.S., Rajkumar, S., Volckens, J., **L'Orange, C**., Keller, K.P., Nelson, T., Peel, J. and Africano, S., August. "Impact of an Improved Biomass Stove Intervention on Inflammation in a Stepped-wedge Trial in Rural Honduras: Intent-to-treat and Exposure-Response" Analyses. 36th Annual Conference of the International Society for Environmental Epidemiology. Santiago Chile.
8. August 28, 2024 Sewor C, Tanner K, Cleveland V, Young BN, **L'Orange C**, Witinok Huber R, Balmes J, Kalisa E, Zurba L, Ntakirutimana T, Keller KP. "Cross-sectional associations between 48-hour fine particulate matter exposure and blood pressure amongst children in rural Rwanda." 36th Annual Conference of the International Society for Environmental Epidemiology. Santiago Chile
9. *May 6, 2024 **L'Orange, C**., Chow, S., "Deployment of Low-Cost Sensors for Calibration of Satellites" MAIA Science Team. Pasadena, CA.
10. March 7, 2024 Hasheminassab, S., L'Orange, C., Sarnat, J., et al., "Ground-Based Speciated Particulate Matter Monitoring as Part of the Multi-Angle Imager for Aerosols (MAIA) Investigation: A Focus on Low-and Middle-Income Countries." EGU 2024 Vienna Austria.
11. *January 27, 2024 **L'Orange, C**., "Sustainable Household Energy Adoption in Rwanda (SHEAR)." ETHOS 2024 Kirkland, WA
12. December 14, 2023 Diner, D., L'Orange, C., Rum, G., et al. "Status of the Spaceborne and In-situ Observational Elements of the Multi-Angle Imager for Aerosols (MAIA) Investigation into Linkages Between Speciated Particulate Matter Air Pollution and Human Health." AGU 2023, San Francisco, CA.
13. December 12, 2023. Mielnik, A., L'Orange, C., Magzamen, S., "Spatiotemporal Distribution of Metals in Fine Particulates across the Denver Metro Area." AGU 2023, San Francisco, CA.
14. October 2, 2023 Cast, J., L'Orange, C., Jathar, S., "Aerosol Emissions and Characterization During the Burning Homes and Structural Materials (BHASMA) Project." AAAR 2023 Portland, OR
15. October 2, 2023 Ruiz Armenta, L., L'Orange, C., Nzkorodov, S., "Absorption Spectra and Brown Carbon Chromophores in Particles Emitted by Burning Structural Materials." AAAR 2023 Portland, OR.
16. *January 9, 2023 Diner, D., L'Orange, C., Xu, F., et al. "Integrated Strategy for Regional Mapping of Speciated Particulate Matter as part of the Multi-Angle Imager for Aerosols (MAIA) Investigation." AMS 2023 Denver, CO.
17. December 15, 2022 Hasheminassab, S., L'Orange, C., Walsh, B., et al. "In-Situ Air Quality Monitoring in Ethiopia for the Multi-Angle Imager for Aerosols (MAIA) Investigation: Spatial and Temporal Trends in Levels and Composition of Ambient PM2.5." AGU 2022 Chicago, IL.
18. October 4, 2022 Tanner, K. L'Orange, C., Volckens, J., "Say It Don't Spray It! Large Droplet Emissions from Speaking, Singing, and Playing Wind Instruments." AAAR 2022 Raleigh, NC.
19. October 4, 2022 Hasheminassab, S., L'Orange, C., Martin. R. et al. "Ground-based Particulate Matter Monitoring Network for NASA's Multi-Angle Imager for Aerosols (MAIA) Investigation: Development Status and Preliminary Results." AAAR 2022 Raleigh, NC.
20. October 4, 2022 Tryner, J, L'Orange, C, Volckens, J. et al "Field Demonstration of a Wearable Particulate Matter and Volatile Organic Compound Monitor." AAAR 2022 Raleigh, NC.
21. September 18, 2022. Slater, K., L'Orange, C., Clark, M. et al. "Impact of the wood-burning Justa stove on Fractional Exhaled Nitric Oxide: A stepped-wedge randomized trial in Honduras." ISEE 2022 Athens Greece
22. *May 21, 2022, L'Orange C. "Design and Performance of Size-Selective Aerosol Sampling Inlets, Part 1." AIHceEXPO 2022, Nashville, TN.
23. *February 22, 2022, L'Orange C. "Capacitación para impulsar la cocción limpia: Sesiones sobre pruebas y

normas previas al Taller," United Nations Foundation/US EPA Lab Training Series, US EPA. Technical Expert, Invited

24. *January 20, 2022, L'Orange C. "Renforcement des Capacités en matière de Cuisson Propre: Atelier portant sur les Normes et les Essais - Sessions virtuelles." United Nations Foundation/US EPA Lab Training Series, US EPA. Technical Expert, Invited
25. *December 7, 2021, L'Orange C. "Introducción a las pruebas de laboratorio y la evaluación de las necesidades de estos," United Nations Foundation/US EPA Lab Training Series, US EPA. Technical Expert, Invited
26. *November 9, 2021, L'Orange, C. "Voluntary Performance Targets (VPTs) for ISO TC 285", World Health Organization, Training Workshop, Invited
27. *July 14, 2021. L'Orange, C. "Mask Testing at Colorado State University," Association of Environmental Engineering and Science Professors (AEESP) Conference, Invited
28. *March 3, 2021. L'Orange, C. "Masks 101." MECH 577 - Aerosol Physics and Technology Guest Lecture.
29. *December 16, 2020, L'Orange, C. "Méthodes d'essai en laboratoire," United Nations Foundation/US EPA Lab Training Series, US EPA. Technical Expert, Invited
30. *December 8, 2020, L'Orange, C. "Confidence in PPE Through Testing and Standards - Identify Emerging Best Practices and Recommendations for Operating in a World with COVID-19.," Clean Summit 2020, Expert Panel Member, Invited
31. September 17, 2020, L'Orange, C., Volckens, J., "Mask Bootcamp 101," Presented, Seminar
32. *December 2019, "An Introduction to Quality Assurance and Quality Control", Pellet Testing Workshop and Practicum, U.S. Environmental Protection Agency, Workshop, Beijing China, Invited
33. *December 2019, "Introduction of Gas Measurements", Pellet Testing Workshop and Practicum, U.S. Environmental Protection Agency, Workshop, Beijing China, Invited
34. *December 2019, "Introduction to Aerosols and Particulate Matter Measurements", Pellet Testing Workshop and Practicum, U.S. Environmental Protection Agency, Workshop, Beijing China, Invited
35. September 6, 2018, "Development of a Pressure Based Real-Time PM Monitor", HICAHS Research Day
36. July 2018, "A Versatile Platform for Low-Cost PM Measurements", Indoor Air 2018, Conference
37. *2016, "An Introduction to Black Carbon", Establishing a Quality Biomass Cookstove Laboratory, Kampala Uganda, Invited
38. *2016, "An Introduction to Data Management", Establishing a Quality Biomass Cookstove Laboratory, Kampala Uganda
39. 2015, "Development of a Low-Cost Integrated Sampler/Sample Pump for Inhalable Particles", American Industrial Hygiene Conference & Exposition, Accepted
40. *2014, "Biomass Cookstoves in the Developing World", AIHA Lunch and Learn, American Industrial Hygiene Association, Seminar, Invited
41. *January 2013, "Cookstove Durability Testing", Cook Stoves and Indoor Air Webinar Series, U.S. Environmental Protection Agency, Seminar, Invited
42. 2011, "Influence of Vaporization Losses on Cook Stove Testing", Indoor Air 2011, Conference, Accepted
43. 2010, "From Concept to Consumer - The Engineering Challenges of Designing and Marketing Improved Cookstoves", CJIELP Symposium - Emerging Solutions for the Energy Poor: Technological, Entrepreneurial, and Institutional Challenges, Colorado Journal of International Environmental Law & Policy (CJIELP), Conference
44. 2010, "Biomass Cookstoves and Energy Justice", Energy Justice, University of Colorado Boulder, Panel, Invited
45. March 2010, "Influence of Stove and Pot Conditions on Particulate Emissions from Biomass Stoves", Western States Combustion Conference, Conference

ENGAGED SCHOLARSHIP

- *Household Energy Webinar Series* – As part of an U.S. EPA funded project, we have been hosting a series of webinars since January 2021. This webinar seeks to increase the awareness, capacity and the number of individuals/organizations providing technical expertise and support in the transition to clean and efficient household energy systems. To date, we have hosted 14 webinars, with talks from ~40 speakers. These experts have come from ~10 countries.

Types of Engagement: Inform and Collaborate

Value to the Community: The webinar series provides a free and convenient method for individuals from around the world to hear from leading energy experts.

Value to the University: This works raises awareness regarding Colorado State University in general and specifically our expertise in clean energy systems. The webinar series has had ~1,300 total attendees.

- *Development of International Standards/ANSI Appointed Technical Expert* – I have served in a volunteer capacity on ISO Technical Committee 285 since 2013. I have actively participated in developing three published ISO documents, with an additional two in development. These published standards have included the translation of methods developed as part of CSU-funded and published research.
Types of Engagement: Inform, Consult, and Collaborate
Value to the Community: Participation in this work has resulted in new information being available in the sector and helping to improve air quality, health, and environmental conditions around the world.
Value to the University: Participation in this work has helped to expand the CSU reputation as an expert in social justice topics such as access to clean cooking and clean air quality. This work has contributed to new CSU funding such as a cooperative agreement with the U.S. Environmental Protection Agency.

- *Testing of Personal Protective Equipment as Part of COVID19 Response*: The aerosol research conducted in our laboratory was pivoted during the COVID19 pandemic to provide testing and verification services related to the efficacy of personal protective equipment (PPE). This testing was done at the request of Governor Polis's COVID Response Team. We have conducted thousands of tests since the pandemic, including time-sensitive tests for the State of Colorado. The State of Colorado often needed next-day information regarding the efficacy of masks to ensure quality products before releasing of payment to vendors. These masks were often distributed to front-line health and emergency personnel. I managed the COVID mask testing program that was conducted out of the CSU aerosol lab and served as a key point of contact for mask testing requests from the State of Colorado COVID Response Team.
Types of Engagement: Inform, Consult, Collaborate
Value to the Community: This work had a direct impact on ensuring front-line workers had access to effective PPE. As these testing services were opened to the broader community, we disseminated knowledge related to identifying proper PPE and how to wear PPE properly. These findings have been shared during multiple invited talks and interviews.
Value to the University: This work has helped raise global awareness regarding CSU expertise in aerosol-related fields, including numerous popular press articles. We have received inquiries from local, regional, and international groups seeking to collaborate with CSU and utilize our fee-for-service capabilities. This work also resulted in funded work from the World Health Organization (subcontract for CU Boulder; PI: Volckens) as well as a community-funded project looking at aerosol emissions from musical instruments. The performing arts study has one published paper with additional papers being prepared.

- *Citizen-Scientist Focused Research:* I am an investigator on a multi-million-dollar NASA-funded citizen science project. This project sought to engage community members in collecting air quality measurement. One goal of the study was to investigate how contributing to scientific studies changed community members understanding of and appreciation for local air quality conditions. The programmatic learnings from this study were used in the preparation of a new research proposal currently under review.
Types of Engagement: Inform, Involve, Co-Creation
Value to the Community: This work generated extensive air quality data information that was available to the public through an online dashboard/website. Feedback from participants indicates that being an active participant in the collection of scientific data made that data more accessible to them. The development of this equipment also allowed NASA to pivot their summer internship programs during COVID. Instead of going to NASA, undergraduate researchers participating in NASA's summer program received out instrumentation and conducted their research experience remotely. This pivot allowed students to gain valuable research experience even though they could not participate in the in-person activities.
Value to the University: This work helped disseminate our work to broad audience and has set the groundwork for future citizen-science-focused research projects. It has provided an opportunity to increase substantially our data management and remote data collection capabilities, which will be critical for future big-data-type projects. Our ability to quickly respond to NASA's request for collaboration in their summer research program has created opportunities for future collaborations. This work has been disseminated through multiple open-source publications and numerous professional presentations.

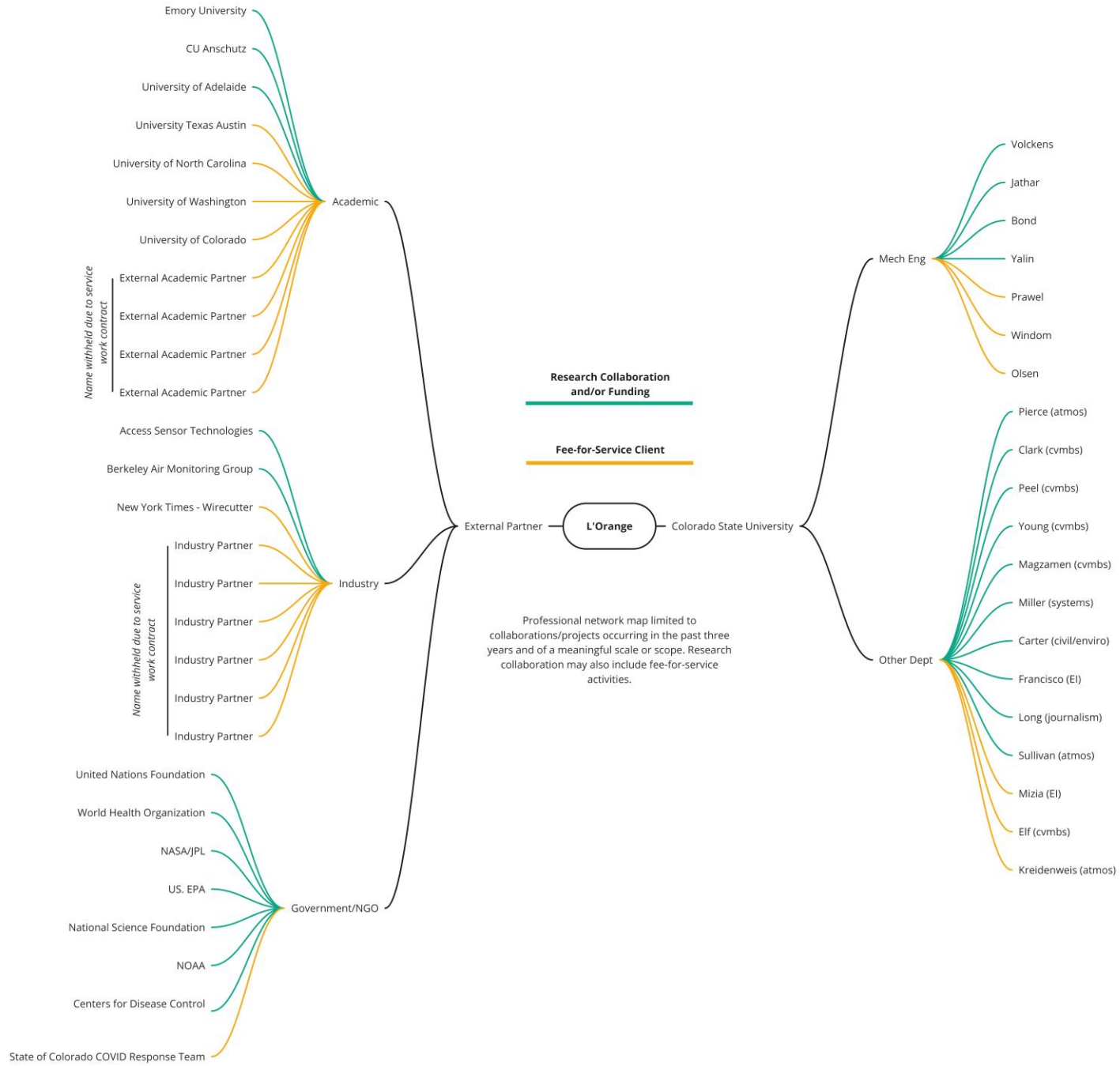
- *Technical Training of International Research Teams:* At the request of the U.S. EPA, I have provided technical training to international laboratories in the developing world on good laboratory practices, applying of ISO TC285 standards, and the management of a sustainable testing facility. These trainings have included in-person and virtual events for countries in Asia, Latin America, and Sub-Saharan Africa.
Types of Engagement: Inform and Collaborate
Value to the Community: These trainings have resulted in disseminating laboratory best practices to 100+ international

researchers, many of whom are graduate or early professionals. As part of these training efforts, we are developing a series of training videos in an effort to disseminate this information as broadly as possible.

Value to the University: These training efforts have helped establish CSU's reputation as premier research facility, specifically in biomass combustion and air quality in the developing world. This raised awareness has resulted in numerous inquiries regarding collaboration and potential opportunities for attending CSU for graduate school.

COLLABORATIVE, INTERCOLLEGIATE & INTERDISCIPLINARY SCHOLARSHIP

Many of my professional endeavors involve interdisciplinary and/or inter-organizational collaborations. These collaborations are instrumental to the impact and success of my work. In most cases, for applied research to be impactful it much reach the general public – inherently this involves interactions with individuals outside of the academic or engineering spheres. I have been fortunate to have had the opportunity to collaborate with many exceptional professionals. These interactions and collaborations have ranged from traditional academic research to providing highly technical fee-for-service style consulting services. Below is a basic network map of some of the major collaborators and organizations I have worked with over the past three years. The map is limited to individuals and organization for which I feel I have had a substantial relationship; the map is also likely not comprehensive. Some names of the external fee-for-service clients have been withheld due to potential contract limitations.



Systematic, Anthro-centric Packages for Protecting Households in Realistic Situations (SAPPHIRES). National Science Foundation (2022 – Present). I am coPI on a recently funded multi-disciplinary project investigating approaches to effectively protect household air quality during adverse air quality events, such as forest fires. I am leading the one of the primary project aims and will be overseeing undergraduate, graduate, and research scientists participating on the project. This project includes researchers from five CSU units as well as an investigator from the University of Illinois at Urbana-Champaign.

MAIA Science Team, Technical Collaborator. Jet Propulsion Laboratory NASA (2021 – Present): I am a technical Collaborator on the NASA Multi-Angle Imager for Aerosols (MAIA) project. MAIA represents the first time NASA has partnered with epidemiologists and health organizations to use space-based data to study human health and improve lives. This work is a key component of this work has been becoming a primary facility for the analysis of air quality samples being collected globally as part of the MAIA project. This project has resulted in multiple conference presentations. Data collection will begin in earnest in late 2022. This work involves collaboration with NASA, Emory University, University of California Davis, and ~9 international field site operators. These operators include academics, US Embassy staff, and

international research organizations.

Center for Energy Development and Health (2017 – Present): I act as the Associate Director for the Center for Energy Development and Health (CEDH) and run the center's day-to-day operations. One of the major functions of the CEDH is providing fee-for-service analysis services related to aerosol and air quality measurements. Every year we act as a vital service to multiple CSU departments and research groups as well as external domestic and international groups. Often these groups utilize our services as they are not experts in our field and do not have the expertise or facilities to complete this work on their own. In the 2020-2021 academic year, this service assisted at least five CSU departments, seven external Universities, and numerous independent organizations. The CEDH is often consulted in the preparation of air quality-related grant proposals; to the best of my knowledge, the CEDH is slated to be utilized in a minimum of seven proposals currently in preparation or under review that were prepared by CSU research teams in the last year.

OTHER ACTIVITIES/ACCOMPLISHMENTS REPRESENTING CONTRIBUTIONS TO THE DISCIPLINE

Patents
"Method and System to Determine a Mask Leakage Rate." L'Orange, C. et al. Under-review
"Respirable and Thoracic Sampling Inlet Assemblies" Leith, D. et al., #17/127,520
"Combustion Chamber for Charcoal Stove." DeFoort, M. et al., U.S. Patent 8,893,703
"Portable Atmospheric Monitor" Miller-Lionberg, D. et al., #62/831,550

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CV SECTION 3:
EVIDENCE OF TEACHING AND ADVISING EFFECTIVENESS

EVIDENCE OF INCORPORATING DIVERSITY, EQUITY, INCLUSION, AND/OR SOCIAL JUSTICE (DEISJ) IN TEACHING AND ADVISING EFFECTIVENESS

I strive to include diversity, equity, inclusion, and social justice topics with students and researchers that I mentor. A few specific examples are included below :

-*Appreciation for Contextual Awareness and Diversity of Perspectives*: My work and team is often involved in multi-disciplinary projects and research in settings outside our community. We discuss the implications of these differences early on in our projects from the context of recognizing that our assumptions on how something will be perceived or used could be different from what actually occurs. We brainstorm potential relevant stakeholders (be internal collaborators, external partners, or study participants) and try to incorporate the voice of these stakeholders early. I frame these conversations as us (the designers/researchers) being too focused on specific aspects of the project and potentially overlooking big-picture issues. We have these discussions in the context of specific projects but try to convey how the same concept can impact many aspects of our lives and the importance of considering and valuing experiences and perspectives broader than our own.

-*Mentoring a Diverse Internship Cohort*: I am CoPI on a National Science Foundation Research Experience for Undergraduates program. We have been making a conscious effort to build summer cohorts that are diverse in gender and background. Our cohorts from 2022 - 2024 had ~2/3 female participants and ~2/3 of the interns self-identified as coming from a historically underrepresented minority group. As part of this program, we had weekly sessions on professional and inter-personal topics, including creating inclusive environments, having difficult or crucial conversations, and asking the weekly guest speakers to discuss how DEISJ play a role in their professional lives.

TEACHING: N/A

ADVISING:

STUDENT ADVISING/GRADUATE SUPERVISION

UNDERGRADUATE STUDENTS:
NA

GRADUATE STUDENTS:
Current Graduate Advisees: 2

Current Graduate Committee Memberships (excluding those chaired):
_____# Plan C
_____# Plan B
__3__# MS/MA
__3__# PhD
Graduate Committee Memberships (for past 5 years, not including those above)
_____# Plan C
_____# Plan B
__2__# MS/MA
_____# PhD
Graduate Degrees Completed Under Your Supervision (past 5 years):0

POSTDOCTORAL STUDENTS/RESEARCH ASSOCIATES: 1

Descriptions of Mentoring Activities
Senior Design Teams: I have provided formal or unofficial mentoring to a total of 12 Senior Design and ME498 students. This mentorship included training in project management, laboratory best practices, technical writing, and aerosol science-related topics. The mentorship included weekly meetings with the students. I have authored two peer-reviewed publications with students I have mentored and have submitted one provisional patent currently under review.

Undergraduate Research Experience Students: I have mentored six students participating in undergraduate research experiences. This mentorship included training in project management, laboratory best practices, technical writing, and aerosol science-related topics. The mentorship included typically conducting multiple mentoring/coaching sessions per week throughout the summer. I am also one of the faculty leads of a three-year NSF-funded Research Experience for Undergraduates program.

Undergraduate Research Interns: I have been the official or de facto supervisor for 17+ hourly undergraduate researchers. I have supported these students through formal training in laboratory safety, laboratory and professional best practices, project management, and technical engineering skills. Typically I would have formal meetings on a weekly basis with these students and numerous informal meetings in any given week.

Other Evidence
External Field Advisor: Served as a mentor and external advisor for an Emory University – Rollins School of Public Health Applied Practice Experience (APE). The APE program is a senior capstone program for undergraduate students studying for an undergraduate degree in Public Health. Advised on the students research plan, monitored activity throughout the semester, and conducted a final review at the end of their program. To date, I have served on four APE advisory panels.

OTHER ACTIVITIES/ACCOMPLISHMENTS – TEACHING/ADVISING

At the request of our U.S. EPA Co-op partners we are developing a video series pertaining to laboratory best practices and applying the new ISO TC285 standards. These videos are being developed in collaboration with the Centre for Research in Energy and Energy Conservation at Makerere University in Uganda.

CV SECTION 4: Evidence of Outreach/Service/Engagement

EVIDENCE OF INCORPORATING DIVERSITY, EQUITY, INCLUSION, AND/OR SOCIAL JUSTICE (DEISJ) IN OUTREACH/SERVICE/ENGAGEMENT

The nature of my work results in many of my projects having some connection to DEISJ topics, often in regard to access to clean energy or clean air. A few specific activities have been highlighted below:
-*Mechanical Engineering Diversity and Inclusion Committee (DEI)*: I have served on the DEI committee since 2020. I

requested to serve on this committee to learn how to be a more effective advocate for DEISJ topics and to be able to actively contribute to moving these initiatives forward. I led the initiative to recruit our first student liaison to the committee in 2021; I continued the initiative in 2022 and we currently have two students providing valuable contributions to the committee. I am also spearheading the development of a plan to encourage faculty and staff to participate in DEISJ-related training. In 2024, I assumed the role of DEI Committee Chair. During the second half of the year, I focused on systematically reviewing the committee's past efforts, evaluating what has been effective, and identifying key priorities to guide the committee's future direction.

-*DEISJ Self-Driven Education*: I recognize that there is much I can learn with regard to DEISJ topics and how I can apply this knowledge both personally and professionally. In recognition of the importance of continual improvement, I have been actively working in recent years to increase my DEI education. This has included participating in the CSU DEI journal club reading with "How to Be an Antiracist" in 2019, receiving training from the CSU Price Center (SafeZone Oct 8, 2020), as well as attending events such as the CSU Diversity Symposium and the ASME "Increasing Women in Mechanical Engineering" (2022) conference. In recent years, I have focused on enhancing my skills in programmatically supporting DEI initiatives. To this end, I have completed the following trainings: "Sustainable DEI: Taking Action as an Individual, Team, and Organization" (Instructor: K. Jaw-Madson, 2024), "Skills and Competencies for Leading Today's DEI Workforce" (Instructor: S. Davis, 2024), "Overcoming Resistance: A Leadership Change Management Model for DEI" (Instructor: M. Winters, 2024)

*__DEISJ Topic__

COMMITTEES

1. *Diversity and Inclusion Committee, Committee Member, Fort Collins, CO, United States, (2020 - Present).
2. Mechanical Engineering Advisory Board, Committee Member, Fort Collins, Colorado, United States, (2020 - 2021).
3. Expert Consultant, CSU COVID19 Response Team. Providing aerosol related expertise to the "Sample Collection, Safety, Training, and Infrastructure" team. (Nov 2020 – Current)
4. Environmental Health Postdoctoral Fellow Environmental Health Postdoctoral Fellow Search Committee, Committee Member
5. Field Project Manager-Clean Energy and Health in Rwanda Field Project Manager-Clean Energy and Health in Rwanda Search Committee, Committee Member
6. Scientific Sourcing Specialist Search Committee, Committee Member

PROFESSIONAL AFFILIATIONS AND ACTIVITIES

Professional Affiliations

1. American Society of Mechanical Engineers
2. American Industrial Hygiene Association
3. American Society for Engineering Education

Ad Hoc Manuscript Refereeing

1. Journal of Occupational and Environmental Hygiene
2. Energy & Fuels
3. Journal of the Air & Waste Management Association
4. Environmental Engineering Science
5. International Journal of Environmental Research and Public Health
6. Energy for Sustainable Development
7. Journal of Aerosol Science
8. Sustainability
9. Atmospheric Pollution Research
10. Environmental Science and Technology
11. Atmospheric Environment
12. World Development

SERVICE WITH EXTERNAL PARTNERS AND COMMUNITIES

1. Committee Member, American National Standards Institute, New York City, NY. Technical expert representing

ANSI on ISO Technical Committee 285 (2013 - Present). Contributing author to ISO/TR 21276:2018, ISO 19867-1:2018, and ISO 198673:2018.

2. Review Committee, National Science Foundation, Mechanical/Aerospace Research Experience for Undergraduates Panel, Division of Engineering Education and Centers (Fall 2022).