Casey Quinn

Research Scientist
Department of Mechanical Engineering
Colorado State University
Campus Delivery 1374, Fort Collins, CO 80523
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Education

Ph.D., Environmental Health - Industrial Hygiene
Colorado State University (2018)
Dissertation: "Low-cost devices for occupational and environmental exposure assessment"
Advisors: John Volckens & Charles S. Henry
Committee: Sheryl Magzamen, G. Brooke Anderson, & Stephen Reynolds

M.S., Mechanical Engineering
Colorado State University (2011)
Thesis: "Evaluation of distributed energy storage for ancillary service provision"
Advisors: Thomas H. Bradley & Daniel J. Zimmerle

B.S., Mechanical Engineering
Kansas State University (2005)
Semester Abroad: České Vysoké Učení Technické (2003)

Professional Experience

Research Scientist 2020-present	**Department of Mechanical Engineering** Colorado State University, Fort Collins, CO
Postdoctoral Fellow 2019-2020	**Department of Mechanical Engineering** Colorado State University, Fort Collins, CO
Engineering Consultant 2016-Present	**NSG Engineering Solutions** Access Sensors Technologies, Fort Collins, CO
Engineering Consultant 2014	**NSG Engineering Solutions** FactorE, Fort Collins, CO
Research Scientist 2013	**Department of Mechanical Engineering** Colorado State University, Fort Collins, CO
Peace Corps Response Volunteer 2012	**Water and Sanitation (WASH)** Peace Corps, Chalaco Piura, Perú
Engineering Consultant 2011-2012	**NSG Engineering Solutions** Envirofit International, Fort Collins, CO
Engineering Consultant 2011-2012	**NSG Engineering Solutions** Bright Energy Storage Technologies, Denver, CO

Referred Publications *(continued)*

Techno-economic Intern — **Energy Storage Developmental Program**
2010-2011 — Woodward Governor Company, Fort Collins, CO

PHEV Grid Interaction Intern — **Energy Storage & Transportation Systems**
2010 — Idaho National Laboratory, Idaho Falls, ID

Peace Corps Volunteer — **Environmental Health**
2006-2008 — Peace Corps, Alto Guayabal, Chiriquí, Panamá

Mechanical Design Engineer — **Mid-States Technical Contracting**
2005-2006 — Case-New Holland, Wichita, KS

Mechanical Engineer Intern — **IAESTE Exchange Program**
2004 — Hydron Unipress, Łódź, Poland

Mechanical Design Engineer — **Engineering Department**
2001-2005 — Advanced Manufacturing Institute, Manhattan, KS

Refereed Publications *(h-index = 11; i-10 index = 11)*

1. **Quinn, C.**, Anderson G.B., Magzamen, S, Henry C.S., and Volckens, J. (2020) "Dynamic classification of personal microenvironments using a suite of wearable, low-cost sensors". *Journal of Exposure Science and Environmental Epidemiology.* 1-9. doi:10.1038/s41370-019-0198-2.
2. Benka-Coker, M.L., Peel, J.L., Volckens, J., Good, N., Bilsback, K.R., L'Orange, C., **Quinn, C.**, Young, B.L., Rakumar, S., Wilson, A., Tryner, J., Africano, S., Osorto, A.B., and Clark, M.L. (2020) "Kitchen concentrations of fine particulate matter and particle number concentration in households using biomass cookstoves in rural Honduras". *Environmental Pollution, 258*, 113697. doi: 10.1016/j.envpol.2019.113697.
3. **Quinn, C.**, Bonne Ford, and John Volckens (2019) "Mobilizing the Low-Cost Sensor Revolution with Smartphones and Citizen Science". *EM, a publication of the Air & Waste Management Association*, Nov: 14-18.
4. Tryner, J., **Quinn, C.**, Windom, B. C., & Volckens, J. (2019) "Design and evaluation of a portable PM 2.5 monitor featuring a low-cost sensor in line with an active filter sampler". *Environmental Science: Processes & Impacts*, *21*(8): 1403-1415. doi: 10.1039/C9EM00234K
5. Ford, B., Pierce, J. R., Wendt, E., Long, M., Jathar, S., Mehaffy, J., Tryner, J., **Quinn, C.**, Van Zyl, L., L'Orange, C., Miller-Lionberg, D., & Volckens, J. (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), 6385-6399. doi: 10.5194/amt-12-6385-2019
6. 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): 5431-5441. doi: 10.5194/amt-12-5431-2019

Referred Publications *(continued)*

7. 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., **Quinn, C.**, Keller, J.P., Weller, Z.D., Africano, S., Osorto Pinel, A.B., and Clark, M.L. (2019) "Study protocol for a stepped-wedge randomized cookstove intervention in rural Honduras: household air pollution and cardiometabolic health". *BMC public health*, *19*(1): 903. doi:10.1186/s12889-019-7214-2
8. **Quinn, C.**, Miller-Lionberg, D. D., Klunder, K. J., Kwon, J., Noth, E. M., Mehaffy, J., and Volckens, J. (2018) "Personal Exposure to PM2. 5 Black Carbon and Aerosol Oxidative Potential using an Automated Microenvironmental Aerosol Sampler (AMAS)". *Environmental science & technology*, *52*(19): 11267-11275. doi: 10.1021/acs.est.8b02992
9. Kelleher, S., **Quinn, C.**, Miller-Lionberg, D. and Volckens, J. (2018) "A low-cost particulate matter (PM 2.5) monitor for wildland fire smoke". *Atmospheric Measurement Techniques*, 11(2): 1087-1097. doi: 10.5194/amt-11-1087-2018
10. Benka-Coker, M.L., Clark, M.L., Rajkumar, S., Young, B.N., Bachand, A.M., Blames, J.R., Brook, R., Nelson, T.L., Volckens, J., Reynolds, S.J., Wilson, A., L'Orange, C., Good, N., **Quinn. C.**, Koehler, K., Africano, S., Osorto Pinel, A.B., 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): 2544. doi: 10.3390/ijerph15112544
11. **Quinn, C.W.**, Cate, D.M., Miller-Lionberg, D.D., Reilly III, T., Volckens, J., and Henry, C.S. (2018) "Solid-phase extraction coupled to a paper-based technique for trace copper detection in drinking water". *Environmental science & technology*, *52*(6): 3567-3573. doi: 10.1021/acs.est.7b05436
12. Volckens, J., **Quinn, C.**, Leith, D., Mehaffy, J., Henry, C.S., and Miller-Lionberg, D. (2017) "Development and evaluation of an ultrasonic personal aerosol sampler". *Indoor Air*, 27(2): 409-416. doi: 10.1111/ina.12318
13. **Quinn, C.**, Zimmerle, D., and Bradley, T.H. (2017) "Impact of Electric Vehicle on Smart Grids". In Borlase, S. "Smart Grids: Infrastructure, Technology, and Solutions". *CRC Press*. doi: 10.1201/b13003
14. Meredith, N.A., **Quinn, C.**, Cate, andM., Reilly, T.H., Volckens, J., abd Henry, C. S. (2016). "Paper-based analytical devices for environmental analysis". *Analyst*, 141(6): 1874-1887. doi: 10.1039/C5AN02572A
15. Good, N., Mölter, A., Ackerson, C., Bachand, A., Carpenter, T., Fedak, K.M., Kayne, A., Koehler, K., Moore, B., L'Orange, C., **Quinn, C.**, Ugave, V., Stuart, A.L., Peel, J. and Volckens, J. (2015) "The Fort Collins Commuter Study: Impact of route type and transport mode on personal exposure to multiple air pollutants". *Journal of exposure science and environmental epidemiology*, 26(4): 398-404. doi: 10.1038/jes.2015.68
16. Zimmerle, D.J., Williams, L.L, Vaughn, T.L., **Quinn, C**., Subramanian, R., Duggan, G.P., Willson, B., Opsomer, J.D., Marchese, A.J., Martinez, D.M., and Robinson, A.L. (2015) "Methane emissions from the natural gas transmission and storage system in the United States". *Environmental Science & Technology*, 49(15): 9374-9383. doi: 10.1021/acs.est.5b01669
17. Quinn, J.C., Smith, T.G., Downes, C.M., **Quinn, C.** (2013) "Microalgae to biofuels lifecycle assessment – Multiple pathway evaluation". *Algal Research*, 4: 116-122. doi: 10.1016/j.algal.2013.11.002
18. **Quinn, C.**, Zimmerle, D., and Bradley, T.H. (2012) "An Evaluation of State-of-Charge Limitations and Actuation Signal Energy Content on Plug-in Hybrid Electric Vehicle, Vehicle-to-Grid Reliability and Economics". *IEEE Transactions on Smart Grid*, 3(1): 483-491. doi: 10.1109/TSG.2011.2168429
19. Bradley, T.H., **Quinn, C.W.**, Campbell, T., Zimmerle, D. (2011) "Comparison of Costs and Benefits of Battery-to-Grid (B2G) and Vehicle-to-Grid (V2G) Systems". *Univeristy of California-Davis/California Energy Commision Report*.

Referred Publications *(continued)*

20. Smart, J., Davies, J., Shirk, M., **Quinn, C.**, Kurani, K. (2010) "Electricity Demand of PHEVs Operated by Private Households and Commercial Fleets: Effects of Driving and Charging Behavior". (No. INL/CON-09-17481). Idaho National Laboratory (INL).
21. Bradley, T.H, **Quinn, C.** (2010) "Analysis of Plug-in Hybrid Electric Vehicle Utility Factors". *Journal of Power Sources*, 195(16): 5399-5408. doi: 10.1016/j.jpowsour.2010.02.082
22. Geller, B., **Quinn, C.**, and Bradley, T.H. (2010) "Analysis of Design Tradeoffs for Plug-in Hybrid Vehicles". In Pistoia, G. "Battery, Hybrid and Fuel Cell Vehicles. Performance, Market and Environmental Issues". *Elsevier*, 159-191. ISBN: 9780444535665
23. **Quinn, C.**, Zimmerle, D., and Bradley, T.H. (2010) "The effect of communication architecture on the availability, reliability and economics of plug in hybrid vehicle-to-grid charging". *Journal of Power Sources,* 195(5): 1500-1509.
24. **Quinn, C.**, Zimmerle, D., and Olsen, D.B. (2010) "Flare gas utilization at combined oil-gas well sites". *Proceedings of the ASME 2010 4th International Conference on Energy Sustainability*, ES2010-90041: 279-284. doi: 10.1115/ES2010-90041

Presentations *(previous 5 years only)*

1. "An Automated Microenvironmental Aerosol Sampler (AMAS) For Location/Activity Exposure Assessment", Poster Presentation. Air Sensors International Conference, Oakland, CA. September 12th 2018.
2. "Personal Exposure to Black Carbon and PM Oxidative Potential in Fresno, CA using an Automated Microenvironmental Aerosol Sampler (AMAS)", Platform Presentation. American Association for Aerosol Research (AAAR) Conference, Raleigh, NC. October 17th 2017.
3. Invited Speaker. "How do Emerging Sensor Technologies Impact the Laboratory Community?". American Industrial Hygiene Conference and Exposition (AIHce), Seattle, WA. June 6th 2017.
4. "Low-Cost Personal Aerosol Sampler and Sensor System", Poster Presentation. Sensor Fair, National Institute of Environmental Health Sciences Fest, Durham, NC. December 7th 2016.
5. "An Automated Microenvironmental Aerosol Sampler (AMAS) for Location/Activity Exposure Assessment", Poster Presentation. American Association for Aerosol Research (AAAR) Conference, Portland, OR. October 19th 2016
6. "Low-cost Technologies for Sampling and Speciation of Particulate Matter Air Pollution", Platform Presentation. International Society for Exposure Science Conference (ISES), Henderson, NV. October 21st 2015.
7. "Low-cost Air Quality Monitoring in the Workplace", Platform Presentation. Future of Occupational Health Symposium, Seattle, WA. June 24th 2015
8. "An Integrated Aerosol Sampler for Occupational Exposure Monitoring", Platform Presentation. American Industrial Hygiene Conference and Exposition (AIHce), San Antonio, TX. June 3rd 2015.
9. Invited Speaker. "A Rapid, Low-Cost Method for Quantifying Metals in Water". Rocky Mountain Water Quality Analysts Association (RMWQAA) Symposium, Blackhawk, CO. April 24th 2015.
10. "An Automated Microenvironmental Aerosol Sampler (AMAS) for Location/Activity Exposure Assessment", Poster Presentation. Colorado State University Graduate Student Showcase, Fort Collins, CO. February 25th 2015.

Honors, Awards, and Fellowships

Finalist, NASA Earth & Space Air Prize (2018)
Outstanding Graduate Student Researcher, Dept. of Environmental and Radiological Sciences (2017)
Top 25 Most Accessed Paper, Analyst, "Paper Based Analytical Devices for Environmental Analysis" (2016)
American Association for Aerosol Research Student Poster Award (2016)
American Association for Aerosol Research Student Travel Grant Sponsorship (2016)
American Industrial Hygiene Association Student Sponsorship to AIHce (2015)
American Industrial Hygiene Foundation Los Alamos Scholarship Award Recipient (2014)
DeField-Buchan Memorial Scholarship Recipient (2014)
Mountain and Plains Education and Research Center Fellowship Grant Trainee (2013-2015)
Clean Energy Supercluster Seed Grant for Energy Storage Systems Utilized for Smart-Grid (2010)
Colorado State Graduate Fellowship (2009)
IAESTE Non-Traditional Destination Scholarship Recipient (2004)
Barton-Dobenin Czech Study Abroad Scholarship Recipient (2003)

Academic Service

Technical Reviewer

Journal of Exposure Science and Environmental Epidemiology (JESEE)
Urban Science— Open Access Journal
International Journal of Environmental Research and Public Health
Fire – Open Access Journal
Atmospheric Environment
IEEE Transactions on Smart Grid
IEEE Transactions on Power Services
Transportation Research Part A: Policy and Practice

Conference Session Chair

American Association for Aerosol Research (AAAR) Conference Oct. 2017

Extracurricular University Service

Colorado State University Alternative Spring Break, Staff Liaison, Achiote, Colón, Panamá, 2015
Peace Corps Informational Presentations at Colorado State University, 2010, 2011, 2012, 2013
IAESTE KSU Local Committee, Membership/Social Chair, 2003 - 2004
Mentors for International Experience, Vice President of External Affairs, 2003 – 2004
Kansas State University Solar Car Vehicle Design Team, Fairing Designer, 2000-2002

Community Involvement

Primary School Science Fair Mentor, Putnam Elementary School, Fort Collins, CO, 2016
5th Grade Math/Science Volunteer, Harris Bilingual Immersion School, Fort Collins, CO, 2014-2016
Kinder Spanish Literacy Volunteer, Harris Bilingual Immersion School, Fort Collins, CO, 2010-2011

Research Experience

Energy Institute/Center for Energy Development and Health
Colorado State University, Fort Collins, CO
Postdoctoral Fellow (2019-present)
Techno-economic and health analysis of electric cooking options for microgrids.
Techno-economic analyses of methane extraction and use from Lake Kivu, Rwanda for the Rwanda Mines, Petroleum and Gas Board.
Pesticide sample and survey collection from households in the California central valley.
Techno-economic analysis of crop drying with zeolite beads. Collaboration with UC-Davis.
Techno-economic analysis of air and water chilling of poultry. Collaboration with UC -Davis.
Firmware and phone application development for the aerosol mass and optical depth (AMOD) sampler used in the Citizen-Enabled Aerosol Measurements for Satellites (CEAMS) project.
Firmware and component selection for development of an aerosol and vapor exposure monitor.

Energy Institute/Center for Energy Development and Health
Colorado State University, Fort Collins, CO
Graduate Research Assistant (2013-2019)
Co-inventor of the Ultrasonic Personal Aerosol Sampler (UPAS) and Automated Microenvironmental Aerosol Sampler (AMAS).
Developed and managed Android and iOS smartphone Bluetooth applications.
Organized and lead a personal air quality pilot study in Fort Collins, CO as part of a National Institute of Environmental Health Sciences grant R21ES024719.
Collaborated with partners at the University of California-Berkeley and California State University-Fresno to organize a personal air quality pilot study in Fresno, CA as part of a National Institute of Environmental Health Sciences grant R21ES024719.
Developed a low-cost colorimetric method for the detection of copper in drinking water.

Engines and Energy Conversion Laboratory
Colorado State University, Fort Collins, CO
Research Scientist (2013)
Managed and evaluated large datasets for the Environmental Defense Fund's evaluation of methane leakage from the U.S. Natural Gas Transmission and Storage sector.
Developed a GUI for quality assurance data analysis of natural gas transmission and storage facility locations in the U.S. using Matlab, Google Earth, and C#.

Engines and Energy Conversion Laboratory
Colorado State University, Fort Collins, CO
Graduate Research Assistant, (2009-2011)
Developed a Matlab/Simulink dynamic thermodynamic model of a positive displacement expander to evaluate product design for Iris Engines, Inc.
Developed MATLAB-based, system-level, techno-economic models of plug-in hybrid electric vehicles providing vehicle-to-grid (V2G) ancillary services.
Worked with EPRI, CAISO, WAPA, Argonne National Laboratory and the NHTS to derive viable communication architectures and PHEV penetration ratios to improve the economic and technical feasibility of V2G.
Collaborated with Fort Collins Utilities and Spirae for future PHEV and Fuel Cell grid interconnections for the FortZED US Department of Energy demonstration.
Developed economic models to evaluate flare gas use for energy needs at oil & gas well sites.

Mentoring, Workshops, and Teaching Experience

Research mentor for four graduate students, 2014-present
Research mentor for five undergraduate student interns (max two concurrently), 2013-2017
Research mentor for NSF Research Experiences for Undergraduates intern, 2015
Aerosol workshop for primary school students, 2015
English language classes for adults, Panamá, 2006-2008
Red Cross International HIV/STI Workshop and four community presentations, Panamá, 2007

Teaching Assistant: Engineering Graphics, Kansas State University Spring, 2002
Lead CAD classes, provided help sessions, and graded homework for 30 students

Non-Academic Experience

Access Sensors Technologies
Fort Collins, CO
Independent Engineering Consultant (2016-Present)
Electronic hardware selection, firmware and phone application software for an aerosol sampler.

FactorE
Fort Collins, CO
Independent Engineering Consultant (2014)
Developed a transient heat transfer model for drying human waste in a greenhouse.

Peace Corps
Chalaco Piura, Perú
Water and Sanitation Response Volunteer (2012)
Provided technical support and assisted in the management of a Municipality and USAID Peru jointly funded project for 34 ecological dry toilets and 32 improved cookstoves.
Facilitated workshops to improve health and hygiene, focusing on open defecation and handwashing.
Created a digital database for the District of Chalaco including a standardized inspection sheet and reporting mechanism to improve management and maintenance of water systems.
Worked with Perú Peace Corps Office Staff to develop a digital tool to provide a standardized mechanism to evaluate the state of health, sanitation and water of Peruvian communities.

Envirofit International
Fort Collins, CO
Independent Engineering Consultant (2011-2012)
Provided support and guidance for the development of solar power and lighting product line.
Conducted lab testing, data analysis and report generation for solar product performance evaluation.
Collaborated with product suppliers and manufacturers for product development and quality control.

Bright Energy Storage Technologies
Denver, CO
Independent Engineering Consultant (2011-2012)
Developed a transient thermodynamic model of compressed air grid storage device.
Operation and evaluation of compressor/expander lab testing.
Evaluation and validation of transient dynamic system model using test results.

Non-Academic Experience *(continued)*

Peace Corps
Alto Guayabal, Chiriquí, Panamá
Environmental Health Volunteer (2006-2008)
Implemented rural water supply, sanitation, and health projects through grant proposal writing, solicitation, and management of funds from local agencies, governmental leaders, and private donors.
Conducted a pilot compost latrine project in conjunction with la Autoridad Nacional del Ambiente.
Provided awareness of clean cook stove health benefits and conducted stove construction workshops.
Conducted water system assessments and worked with water committees to implement projects.
Assisted other Peace Corps volunteers with water system and sanitation project evaluations.
Provided language translation for U.S. Southern Command Medical tour.
Wrote tri-monthly work plans and reports for counterpart governmental agencies and Peace Corps.
Developed an advanced level of Spanish language proficiency and working knowledge of Ngäbere.

Woodward Governor Company
Fort Collins, CO
Graduate Student Intern (2010-2011)
Provided techno-economic support and guidance for grid storage devices.
Developed dynamic system modeling of grid storage devices.

Idaho National Laboratory (INL)
Idaho Falls, ID
Graduate Student Intern (2010)
Analyzed PHEV and Hybrid vehicle data collected in real world driving and track testing.
Developed fact sheets and technical reports documenting vehicle data for public domain publication.
Assisted in the development of INL's reporting metrics and deliverables for the DOE EV Project.

Case-New Holland
Wichita, KS
Cost Reduction Contract Engineer (2005-2006)
Conducted cost reduction design analysis and implementation utilizing Pro/E, I-Link, & PDM.

Hydron Unipress
Łódź, Poland
International Association for the Exchange of Students for Technical Experience Intern (2004)
Used Solid Edge to produce a solid model and technical drawings of a vertical hydraulic press.
Developed basic Polish language skills to facilitate communication in the workplace.

Advanced Manufacturing Institute
Manhattan, KS
Design Engineer, (2001-2005)
Designed, monitored, and maintained accelerated life tests.
Gained experience with one-off machine design and build and reverse engineering projects.
Became proficient with solid modeling & technical drawing creation using Pro/E.
Developed hydraulic and pneumatic systems on various projects.
Manufactured simple parts using a mill, lathe, drill press, and other hand tools.

Professional Societies

American Association for Aerosol Research
American Industrial Hygiene Association
International Society for Exposure Science

Languages

Spanish: Advanced-medium proficiency certificate
Ngäbere: Intermediate proficiency

Patents

“Portable Atmospheric Monitor”, filed 2020, PCT/US2020/027524
“Sampling Device for Exposure Measurement of Particles and Gases”, filed 2019, PCT/US19/033850
“Portable Air Sampling Device”, Published, US 2020/0049598 A1

Technical Skills

Proficiency with: Matlab, R, C++, C#, Swift, Java, Pro/Engineer
Familiarity with: SolidWorks, Python, html, EES, Aspen Plus