Air Sensors International Community

2023 International Connection Hub Ghana Conference

Accra, Ghana ~ October 17-19

UCDAVIS
AIR QUALITY RESEARCH CENTER

CLEAN AIR FUND

About the ASIC Ghana Conference

UC Davis Air Quality Research Center, with support from the Clean Air Fund, designed this year's International Connection Hub around the theme of "Focusing on the Basics." The conference vision is to improve air quality throughout Africa by teaching communities, city managers, environmental health officers, industry developers and regulators, how to effectively use air quality sensors and the data produced to be able to understand the heavy health and economic cost of air pollution to create massive changes in regulatory and personal actions that significantly influence air pollution levels. Our team encourages the development of enhanced air quality management systems through open discussion of local issues and exposure to the latest air quality sensor technology.

Goals & Outcomes

This conference will strengthen capacity among all participants on the fundamentals of air quality sensors, highlight the achievements in low-cost sensor use for air quality in Africa and equip various users with tools and trainings to effectively use small, low-cost sensors for air quality improvement within African countries. Through the conference, we aim to:

1. Facilitate a dialogue between researchers, communities, industry members, city managers, and regulators on the topic of low-cost sensor use in Africa.

2. Improve understanding of air pollution's effects on personal health among communities, city managers and regulators; highlight the impacts on the economy and the climate.

3. Expand technical know-how among key audiences on the use of applications of sensor data, including:

   A- All: fundamentals of low-costs sensors: what they are, how they differ from regulatory-grade monitors, how to choose one for each situation, and how to effectively use and maintain the sensors

   B- Sensor network developers: how to develop and maintain networks by discussing pilot studies and highlighting effective long term operational networks.

   C- Researchers and regulators: how to evaluate low-cost sensor data and use it to effectively spur policy actions or test effectiveness of interventions.

Thank you to our Committee Members

UC Davis AQRC enlisted the support from over 20 other individuals and dozens of organizations with knowledge and experience in air quality sensors and community science to create an incredible program experience in Accra. We would like to express our greatest appreciation for our partners and committee members who have shared knowledge and given time to make this enriching educational conference possible.

Robert Mbiake
University of Douala, ANGA

Rebecca Garland
University of Pretoria, ANGA

Emmanuel Appoh
Consultant

Deo Okure
AirQo

Kofi Amegah
University of Cape Coast

Samuel Agyei-Mensah
University of Ghana

Allison Hughes
University of Ghana

Victor Indasi
C40 Cities

Collins Gameli Hodoli
University of Environment and Sustainable Development

Vasu Kilaru
US EPA

Victoria Owusu Tawiah
Clean Air Fund

Iq Mead
Imperial College London

Pallavi Pant
Health Effects Institute

Rose Alani
University of Lagos

George Mwaniki
Clean Air Catalyst

Engineer Bainomugisha
AirQo

Solomon Bililign
North Carolina Agricultural and Technical State University

Garima Raheja
Columbia University

Dan Westervelt
CAMS-Net, Columbia University

R. Subramanian
Center for Study of Science Technology and Policy

Victor Nthusi
Health Effects Institute

We couldn't do this without you!

Thank you to our Generous Sponsors!

The sponsorships from these sponsors supported the travel scholarships we offered to the program committee, speakers, poster presenters and attendees! Please share your appreciation for their support by visiting their exhibit booths!

Visit IQAir online: https://www.iqair.com/

Visit Clarity online: https://www.clarity.io/

SCHEDULE AT A GLANCE

TUESDAY, OCTOBER 17, 2023

9:00 AM	Sensor Evaluation Center Tour at the University of Ghana
11:00 AM	Registration Opens
11:30 AM	Lunch Opens
12:30 PM	Opening Welcome
1:00 PM	Sensor Evaluation & Analysis: Best Approaches to Evaluate Sensors
2:45 PM	Break
3:15 PM	Community Based Participation in Using LCS
4:25 PM	Making Sense of Sensor Data
5:40 PM	Exhibitor Presentations
6:00 PM	Welcome Reception & Discussion with Exhibitors
7:15 PM	Reception Concludes

WEDNESDAY, OCTOBER 18, 2023

7:30 AM	Registration & Breakfast
8:30 AM	Keynote: Why should we care what the data says?
9:30 AM	Break
10:00 AM	Data Collection, Analysis & Interpretation
11:40 AM	Poster Presentations & Review Session
1:10 PM	Lunch
2:10 PM	Adapting LCS for Smart AQ Monitoring in African Cities
3:40 PM	Break
4:00 PM	Keynote: Shaping the Future of Data Accessibility for Action
6:00 PM	Day 2 Concludes

THURSDAY, OCTOBER 19, 2023

7:30 AM	Registration & Breakfast
8:30 AM	Data Utility & Action for AQ Management
8:30 AM	Journalist Training
9:55 AM	Policy Management
11:10 AM	Break
11:30 AM	Utilizing Various Communication Strategies to Increase Public Engagement on Air Pollution
12:45 PM	Lunch
1:45 PM	Mobilizing Resources to Support Air Quality Monitoring Research
3:45 PM	Closing Remarks
4:00 PM	Conference Conludes

CONFERENCE PROGRAM

9:00 AM   **Sensor Evaluation Center Tour** *at the University of Ghana*

11:00 AM   **Registration** *at the Accra Metropolitan Assembly Building*

11:30 AM   **Lunch** *on the AMA building front lawn*

12:30 PM   **Opening Remarks** *by Dr. Tony Wexler, Air Quality Research Center, University of California, Davis & Special Guest*

1:30 PM   **Sensor Evaluation & Analysis: Best Approaches to Evaluate Sensors**

     Hosted & Moderated by Dr. R. Subramanian, *CSTEP* & Dr. Mike Giordano, *AfriqAir*

     Panelists: Dr. Allison Hughes, *University of Ghana*, Dr. Nuria Castell, *NILU*, Dr. Adrien Arfire, *Airparif*, Dr. Brigitte Language, *North-West University*

2:45 PM   **Break -** *Coffee and Refreshments in Oko Vanderpuye Chamber*

3:15 PM   **Community Based Participation in Using Low Cost Sensors**

     Hosted by Prof. Kofi Amegah, *University of Cape Coast*

   Assessment of Personal Exposure to Particulate Matter Among Furniture Manufacturers

     Mr. Abdou Safari Kagabo, *University of Rwanda*

   Participatory Air Quality Monitoring in African Cities: Empowering Communities, Enhancing Accountability, and Ensuring Sustainable Environments

     Mr. Fidel Wabinyai, *AirQo*

   Breathe Accra Project: A Community-Based Air Quality-Monitoring Network for the Greater Accra Metropolitan Area

     Mr. Kelvin Yeboah, *Breathe Accra*

4:20 PM   **Making Sense of Sensor Data**

     Hosted by Dr. Dan Westervelt, *University of Columbia*, Dr. Collins Gameli Hodoli, *University of Environment and Sustainable Development*

   PM2.5 levels in an unstudied area of rural Ghana using relatively low-cost sensors.

     Dr. Solomon Otoo Lomotey, *University of Environment and Sustainable Development, Somanya*

   Presentation by Dr. Gabriel Okello, Prince of Wales Global Sustainability Fellow

     Dr. Gabriel Okello, *University of Cambridge*

   Getting useful, actionable data out of low cost sensors in Africa

     Ms. Garima Raheja, *Columbia University*

   Preliminary study of in-car air pollution using optical particle counters

     Dr. Bertrand Tchanch Fankam, *Alioune Diop University, Senegal*

5:40 PM   **Exhibitor Presentations**

     IQAir - Dr. Christi Chester Schroeder

     Clarity - Mr. Sean Wihera

     AirQo - Mr. Deo Okure

6:00 PM   **Welcome Reception & Discussions with Exhibitors**

7:15 PM   **End of Day 1**

CONFERENCE PROGRAM

7:30 AM **Registration**

8:30 AM *Keynote Introduction by Clarity - Mr. Levi Stanton & Mr. Lee Swanson*

8:35 AM **Keynote: Why should we care what the data says?**

Panelists: Prof. Kofi Amegah, *University of Cape Coast* , Dr. Gabriel Okello, *African Centre for Clean Air*

9:30 AM **Break -** *Coffee and Refreshments in Oko Vanderpuye Chamber*

10:00 AM **Data Collection, Analysis & Interpretation**

Hosted by Ms. Victoria Owusu Tawiah, *Clean Air Fund,* Ms. Garima Raheja, *University of Columbia*

Monitoring the Diurnal and Seasonal Variation of Ambient Particulate Matter (PM2.5) using Low-Cost Sensors in Juja, Kenya

Ms. Josephine Ndiang'ui, *Jomo Kenyatta University of Agriculture and Technology*

Algorithm for estimating particulate matter concentrations using Landsat 8 multi-spectral satellite images: An urban air quality mapping over Accra, Ghana

Mr. Cosmos Wemegah, *University of Energy and Natural Resources*

Low-Cost Filter Collection for analysis of Chemical composition of atmospheric aerosols in Africa

Dr. Solomon Bililign, *North Carolina A&T State University*

Demonstrating the power of well-calibrated low cost sensors on the African continent: examples from East, West, and Central Africa

Dr. Dan Westervelt, *Columbia University, Lamont-Doherty Earth Observatory*

11:40 AM **Poster Presentation and Review Session**

Review posters hanging in the two main conference rooms & discuss the work with the researchers

1:10 PM **Lunch** *on the AMA building front lawn*

2:10 PM **Adapting LCS for Smart AQ Monitoring in African Cities**

Hosted by Mr. Deo Okure, *AirQo* , Prof. Engineer Bainomugisha, *AirQo*

Moderated by: Mr. Ngongang Danube, *Stockholm Environment Institute Africa* & Ms. Dorothy Lsoto, *University of Wisconsin Madison*

The Lifecycle of Low-Cost Sensor Networks for Air Quality Data in African Cities

Mr. Usman Ahmed, *Code for Africa*

AirQo sensor kit: an air quality sensing kit custom designed for low-resource settings

Mr. Deo Okedi, *AirQo*

Low-cost Sensors Development and Deployment

Mr. Gideon Maina, *Code for Africa*

3:40 PM **Break -** *Coffee and Refreshments in Oko Vanderpuye Chamber*

4:00 PM **Keynote: Shaping the Future of Data Accessibility and Transparency for Action**

Hosted by Dr. Vasu Kilaru, *US EPA* , Dr. Pallavi Pant, *HEI* , Mr. Deo Okure, *AirQo* , Dr. IQ Mead, *Imperial College London*

Moderated by: Dr. Pallavi Pant, *HEI*

Panelists: Dr. Christa Hasenkopf, *Energy Policy Institute at the University of Chicago* , Dr. Iq Mead, *Imperial College London, Breathe London* , Prof. Engineer Bainomugisha, *AirQo*

6:00 PM **End of Day 2**

CONFERENCE PROGRAM

7:30 AM **Registration**

8:30 AM *Thursday Welcome by IQAir - Mr. Clifford Fleck*

8:35 AM **Data Utility & Action for AQ Management**

    Moderated by: Dr. Victor Indasi, *C40*, Mr. Emmanuel Appoh, *Consultant*, Dr. Rose Alani, *University of Lagos*

Empowering cities with Air Quality Data Evidence to inform Policies and decision making

    Dr. Simon Sambou, C40 Cities

Air quality standards and the importance of an AQI for Ghana

    Ms. Esi Nerquaye-Tetteh, Ghana EPA

Health Exposure Assessment

    Dr. Reginald Quansah, Ghana EPA

Eko for Clean Air: a Case study on Public sector guidance, regulatory audit and enforcement changes driven by inclusive air quality and behavioral data collection systems in Lagos State, Nigeria

    Dr. Adebola Odunsi, LASEPA

8:35 AM **Journalist Training** *in the Naa Deidei Chamber*

9:55 AM **Policy Management**

    Hosted by Dr. Rebecca Garland, *University of Pretoria & ANGA*, Dr. Victor Indasi, *C40*, Mr. Victor Nthusi, *HEI*

Using a low-cost sensor network for evidence driven air quality management in an African city: lessons from Kampala, Uganda

    Dr. Alex Ndyabakira, Kampala Capital City Authority

Air Pollution in Africa: Creating Healthier Cities for Future

    Mr. Egide Kalisa, *University of Rwanda*

Fusing small sensors with policymaking: a transdisciplinary approach to measuring urban air pollution

    Mr. Seán Schmitz, Research Institute for Sustainability, Helmholtz Centre Potsdam

Johannesburg's Innovative Utilization of LCS Data to Embrace Ambitious Clean Air Targets

    Mr. Lindelani Munyadziwa, *City of Johannesburg, S. Africa*

11:10 AM **Break -** *Coffee and Refreshments in Oko Vanderpuye Chamber*

11:30 AM **Utilizing Various Communication Strategies to Increase Public Engagement on Air Pollution**

    Hosted by Dr. Robert Mbiake, *University of Douala & ANGA*, Dr. Pallavi Pant, *HEI*

Enabling participatory approaches to co-designing of air quality management solutions: The AirQo Experience

    Ms. Maclina Birungi, *AirQo*

Communicating air sensor data: co-designing visualisations through the Breathe London Community Programme

    Dr. Kayla Schulte, *Imperial College London*

Youth-driven citizen science for healthy climate resilient cities

    Dr. Monika Kamkuemah, *University of Pretoria*

Role of Journalism in increasing Public engagement on Air Polution; Insights from EJN media Workshop in Nairobi

    Dr. Jackline Lidubwi, *Internews Network*

12:45 PM **Lunch** *on the AMA building front lawn*

1:45 PM **Mobilizing Resources to Support Air Quality Monitoring Research**

    Hosted by Dr. R. Subramanian, *CSTEP*, Dr. Allison Hughes, *University of Ghana*

    Moderated by: Dr. Mike Giordano, *AfriqAir*

    Panelists: Mr. Desmond Appiah, *Clean Air Fund*, Dr. Langley Dewitt, *IGAC*, Dr. Rose Alani, *University of Lagos*

3:45 PM **Closing Remarks** *by Dr. Tony Wexler, Air Quality Research Center, UC Davis*

4:00 PM **End of Conference**

POSTER PRESENTATIONS

1   Performance evaluation of low-cost Atmotube sensors for air quality measurements

      Aishah Shittu, Institute of Climate and Atmospheric Science, School of Earth and Environment | University of Leeds

2   A Sensor Evaluation Centre for Africa: Afri-SET

      Allison F. Hughes, University of Ghana

3   AirQo Data Logger: A low-cost approach to reference grade monitors data retrieval

      Anold Nsubuga, AIRQO

4   Spatial and temporal monitoring of PM2.5 using low-cost sensors in Burkina Faso

      Bernard Nana, Ecole Normale Supérieure

5   Philanthropic Opportunities in the Global Air Quality Data Landscape

      Christa Hasenkopf, Energy Policy Institute at the University of Chicago

6   Utilizing Communication Strategies to Increase Public Engagement on Air Pollution

      Church Essien, University of Uyo

7   Air Pollutant Concentrations and Epidemiological Impacts in the Humid Tropical Environment of Nigeria

      Ekanem Ekanem, University of Uyo

8   Analysis of PM2.5 and PM10 Particles from Low-Cost Sensor Networks in Major Urban Cities of Ghana

      Emmanuel Appoh, Afri-SET Evaluation and Testing Facility, Department of Physics, University of Ghana

9   AIR POLLUTION AND CLIMATE VARIABILITY IN THE HUMID TROPICAL ENVIRONMENT OF NIGERIA

      Felix Paul, University of Uyo

10   Air Quality Index and Health Dynamics in the Changing Climate of the Humid Tropical Environment of Nigeria

      Felix Paul, University of Uyo

11   Influence of Wind Speed, Wind Direction, Relative Humidity, and Seasonal Variability on Ambient Air Quality in Kampala Meteorological Area

      FIDEL WABINYAI, AirQo

12   Particulate Matter, Toxicity Potential, Air Quality Index, and Hazard Quotient of an Indoor Setting

      Francis Olawale Abulude, Environmatal and Sustainable Research Group, Science and Education Developmet Institu

13   Enhancing Community Participation in Air Quality Management: A leverage on Climate Change and Health Frameworks in Kenya

      Godwin Opinde, Kenyatta University

14   Monitoring and analysis of air pollution data from low cost sensors in selected major Nigerian cities

      Igwe-Steve O. Ewona, Environmental Monitoring and Energy Research Group-Africa, EMERGAfri

15   Machine Learning Approach for Particulate Matter Prediction Near the Quarry Industries in SE Nigeria.

      Imoh Ekpa, Federal University of Technology Ikot Abasi

16   Air pollution in urban Ouagadougou

      Issoufou OUARMA, Universite NAZI boni / Centre universitaire de Banfora

17   Design, testing and cost analysis of low-cost air quality monitoring systems

      Jacob Mbarndouka Taamté, Institute of Geological and Mining Research

18   Design and Development of Indoor Occupancy Sensor for Enhance Energy Conservation in University of Lagos

      Manasseh Shitta, National Centre for Energy Efficiency and Conservation, University of Lagos

19   The Influence of Nearby Pollution Sources on Ambient Air Quality: A Case Study of Ho, Tamale and Takoradi

      Maxwell Seyram Sunu, Environmental Protection Agency, Ghana

20   Role of Researchers and Communication Experts in the transfer of knowledge relating to air pollution. Mastery of the knowledge transfer process

      MBIAKE Robert, Université of Douala

POSTER PRESENTATIONS

21 The Difference Between Accurate and Reliable Data Relating to the Concentration of Atmosphere Constituents.
    MBIAKE Robert, Université of Douala

22 Development of a Correction Model for LCS for Ambient PM2.5 Monitoring in the City of Mombasa
    Moses Njeru, University of Nairobi

23 Characterizing PM2.5 levels in Basic schools network of Purple Air (PA) monitors in rural communities in Ghana
    MUJTABA MOHAMMED NUHU, Kintampo Health Research Centre

24 Air quality data collection, analysis and interpretation
    Nsikak Charles, Tropical Research And Conservation Center (TRCC), Nigeria

25 NILU's Sensor Data Infrastructure: Innovative Management of Air Quality Sensor Networks
    Nuria Castell, NILU - Climate and Environmental Research Institute

26 Collection, processing and use of data in NordicPATH
    Nuria Castell, NILU - Climate and Environmental Research Institute

27 Validating the reproducibility and reliability of data collected by Purple Air and Temptop 1000 series low-cost monitors in ambient air quality studies
    Paul Njogu, Jomo Kenyatta University of Agriculture and Technology

28 Air Pollution Control using a Homemade Non-Thermal Plasma Technology
    Prince Asilevi Jr., Kwame Nkrumah University of Science and Technology

29 Sensing the city: The why and how of sensor network operation and data for mapping multiple air pollutants (and noise pollution) in sub-Saharan Africa.
    Raphael E Arku, Department of Environmental Health Sciences, University of Massachusetts

30 Unlocking the Potential of Low-Cost Air Pollution Sensors: Insights from the QUANT Project
    Sebastian Diez, Universidad del Desarrollo / University of York

31 Hardware Measures, Software Models
    Sebastian Diez, Universidad del Desarrollo / University of York

32 Inseparable link between Air Pollution and Climate Change- Cleaning the Air as a Strategy for Climate Mitigation
    Solomon bililign, North Carolina A&T State University

33 Performance evaluation of multiple air pollution sensors: Case of an Indian coastal city
    Sreekanth Vakacherla, Environmental Defense Fund

34 Plastic waste burning in Ghana communities and schools
    Steve Shillrud, Lamont-Doherty Earth Observatory of Columbia University

35 Characterizing PM2.5 levels in a peri-urban setting in Ghana
    Sulemana Watara Abubakari, Kintampo Health Research Centre

36 Establishing An Integrated Ambient Air Quality Monitoring Network In The Gambia Using Low-Cost Air Sensors: The Permian Health Clean Air Initiative
    Sunkaru Touray, Permian Health | The Lung Institute

37 Assessing the Spatial Transferability of Calibration Models across a Low-cost Sensors Network
    Vasudev Malyan, Indian Institute of Technology Bombay

38 Medical Implications of Air Contamination in selected polluted areas of Nigeria.
    Victory Dennis, University of Uyo

39 Understanding PM2.5 variation based on ground activities in Punjab, India
    VIGNESH PRABHU, CENTER FOR STUDY OF SCIENCE TECHNOLOGY AND POLICY

40 Characterizing Aerosol Sources from Low-Cost Particle Sensors
    Vikas Kumar, Indian Institute of Technology Bombay
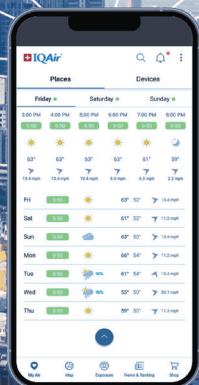
IQAir AirVisual Platform:
The Future of Air Quality Monitoring

The Power of AirVisual

Air Quality Sensors

The AirVisual Outdoor perfectly integrates within IQAir's ambient air quality monitoring platform. Seamlessly track PM2.5, PM10, CO2 and other vital parameters, all integrated effortlessly with the AirVisual app for real-time insights.

Air Quality Dashboard

For larger projects requiring comprehensive data, device, and location management, the Dashboard is at your fingertips. Monitor your air and control an entire air quality network. Simplified integration, remote monitoring and network management with pollution alerts, via a user-friendly web platform.

Air Quality API

Unleash creativity and engagement with the AirVisual API tools. With utmost flexibility, showcase or integrate your air quality data, ensuring enhanced user engagement for projects of all sizes.

FREE Air Quality App

Comprehensive air quality data for you and your constituents. Live, forecasted, and historical AQI data from 80,000+ sensors globally. Alerts, health tips, and updates from over 5,000 cities in 100+ countries.

Contributor Profile

Your clean air narrative matters. Whether you're an organization, community group, or an individual advocate, you can create a unique contributor profile to elevate your presence and spotlight initiatives. Then, utilize customizable features that help you connect, inspire, and amplify your impact.

Widgets

Enhance your online presence with the AirVisual air quality widget. Provide crucial air quality and weather insights and become a staple source of local information. Seamless functionality across platforms guarantees consistent user experience.

Why AirVisual?

- **Pioneering Insights:** Experience hyperlocal AQI readings, forecasts, and share your findings with millions for informed decisions.
- **Fast & Flexible Deployment:** Establish a robust network of AirVisual sensors without the complexities of third-party integrations.
- **Tech-Adaptable & Scalable:** Fully API-enabled, ensuring seamless integrations now and adaptability for upcoming innovations.

Dive into the future with IQAir's AirVisual Platform and transform how you understand and communicate air quality.

Scan to learn more or email **solutionsengineer.na@iqair.com** and call us at **+1 562 903-7600**

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Become a Data Contributor:
Empower the World to Breathe Cleaner Air

Community Air Quality Monitoring

The air we breathe affects us all. Yet, vast regions of the world remain underserved, missing vital air quality data. Please answer the call and become an air quality data contributor.

Why Become a Data Contributor

- **Access IQAir's Free Dashboard**: Gain powerful insights, track data, and manage your entire air quality network effectively with free access to IQAir's **Dashboard**.
- **Data Driven Change**: Feed critical research on air pollution with your invaluable data.
- **Spread the Word**: Showcase your community's air quality and your endeavors on our premier app and across various social channels.

Who Can Become a Contributor

Individuals (citizen scientists), academic institutions, governments, community bodies, or anyone passionate about air quality.

Join the Clean Air Revolution

IQAir provides comprehensive, on-going training and support. You'll also receive a dedicated Contributor account to showcase your contributions. Share your story and your mission as an air quality contributor. Register your device(s) for free on the AirVisual app. Or visit: **https://www.iqair.com/air-quality-community**
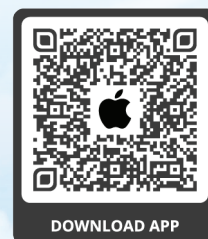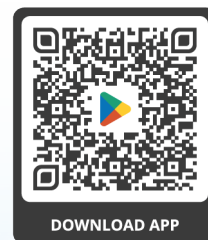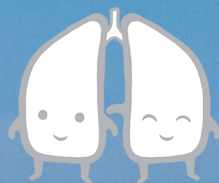
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Thank You for Attending
from the
UC Davis Air Quality Research Center!

Our mission at the AQRC is to facilitate research on the scientific, engineering, health, social, and economic aspects of gaseous and particulate atmospheric pollutants. The best way for us to facilitate the research and education of the world is through educational conferences like this. We thank you, as our attendees, for joining us to learn about new science and technology and for sharing your experiences and knowledge with the world.

We look forward to hosting you again for ASIC 2024!

To keep up to date with UC Davis AQRC events including ASIC 2024, join our mailing list:
https://asic.aqrc.ucdavis.edu/contact
Visit our website to learn more about the UC Davis AQRC research activities and events:
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Learn about the Clean Air Fund:
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A Special Thanks to the Clean Air Fund for Sponsoring the International Connection Hub Conference Series!