

# UCR

## Why UCR?

California Air Resources Board  
October 29, 2015

UNIVERSITY OF CALIFORNIA, RIVERSIDE

# University of California, Riverside

- ▶ Student Population
  - ▶ Undergraduate : 18,621
  - ▶ Masters: 812
  - ▶ M.D.: 162
  - ▶ Ph.D: 1465
- ▶ Research Funding: Over \$120M
  - ▶ \$98M federal: National Science Foundation, Environmental Protection Agency, National Institutes of Health, Department of Energy, Department of Transportation, Economic Development Agency, USDA, DARPA, Department of Education
- ▶ Technology Commercialization & Economic Development
  - ▶ Over 300 Patents
  - ▶ 6 Startup companies last year
  - ▶ ExCITE incubator partnership



# Nox Out

- › <https://www.youtube.com/watch?v=9WycpEwdEA0>

# University of California, Riverside

- › Bourns College of Engineering
  - › Center for Environmental Research & Technology
  - › Environmental Engineering Degree Program



- › School of Medicine
  - › BREATHE Center: Bridging Regional Ecology and Aerosolized Toxins to understand Health Effects
- › Public Policy
  - › Environmental and Transportation Policy

## Portable Emission Monitoring Systems at UCR

- Leading research institute worldwide
- Development of some of the most comprehensive PEMs systems
- Partner with EPA, ARB, & Caltrans in developing protocols for technology verifications
- Host International PEMs Conference in 6<sup>th</sup> year



# National Science Foundation CAREER Awards



Akua Asa-Awuku: Toward an understanding of secondary aerosol formation, particle aging in droplets, and cloud processing



David Cocker: Evaluating Secondary Organic Aerosol Formation Processes



Roya Bahreini: Researching Chemical and Optical Properties of Secondary Organic Aerosol and Effective Practices for Environmental Science Education

# Example Research Projects

- ▶ Chemistry
  - ▶ A Fuel Component for Stabilizing Alcohol-Diesel Mixtures
- ▶ Statistics
  - ▶ Statistical Methods to Evaluate Air Quality Simulations
- ▶ Agriculture
  - ▶ Reducing Emissions of Volatile Organic Compounds (VOCs) from Agricultural Soil Fumigation
- ▶ Medicine
  - ▶ Effects of Components of Air Pollution on Signaling in the Brain
- ▶ Policy
  - ▶ Urban Designs and Traffic Management Strategies for Southern California that Reduce Air Pollution Exposure

# Example Research Projects

## Center for Environmental Research & Technology

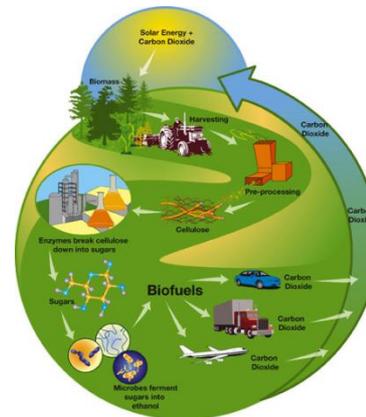
- › A Post Regulatory Evaluation of the Cost and Economic Impact Estimates of Air Pollution Control Regulations
  - › Activity, Durability, and Emissions Reductions from Cordless Electric Lawn and Garden Equipment
  - › Advanced Continuous Biomass Hydrolysis And Fermentation
  - › Air Quality and Emissions Measurement at the University of California, Riverside
  - › Air Quality and Emissions Measurement to Quantify/Characterize the Contribution to Local and Regional Air Quality from Advanced Technology,
  - › AIR QUALITY IMPACTS OF LOW VAPOR PRESSURE-VOLATILE ORGANIC COMPOUNDS
  - › Air Quality Improvement Program (AQIP): Hybrid Deployment and Testing Evaluation
  - › Air Quality: The Effectiveness of Managed Lanes in California
  - › Ammonia - Organic Chemistry and Secondary Organic Aerosol Yield in the Troposphere
  - › Ammonia Emissions from Late Model Vehicles
  - › Analysis of GPS-Based Vehicle Activity Data for Light Duty Vehicles
  - › ...
  - › Using Waste to Clean Up the Environment: Cellulosic Ethanol, the Future of Fuels
  - › Vehicle Activity Analysis Using Stochastic and Signal Processing Techniques and its Application to Energy and Emissions Modeling
  - › Vehicle Activity and Mobile-Source Emissions in National Parks
  - › VISTAS Phase II: Emissions and Air Quality Modeling
- › Zero/Near Zero Emissions Truck Testing & Demonstration Guideline Plan

# UCR: Over 300 Patents

- › Environmentally friendly navigation techniques
- › Shared vehicle system and method involving reserving vehicles with the highest states of charge
- › Variable gaseous fuels (vgf) engine
- › Diesel fuel synthesis from carbonaceous feed stocks using self-sustained hydro-gasification
- › A single phase water solvent system to fractionate cellulosic biomass
- › Drop-in hydrocarbon fuels through novel integration of biological and catalytic conversion of biomass
- › Methane rich fuel gas from carbonaceous feedstocks
- › Xylose release from lignocellulosic biomass by oxalic acid pretreatment

# Committed to Sustainability

- Carbon Neutral by 2025 – UC Presidential Initiative
- Largest solar farm in UC system – 3MW
- Research:
  - Green Chemistry
  - Batteries
  - Smart grids
  - Alternative fuels
- Clean fleet: electric and CNG
- LEED residence halls
- Dining Services



# UCR's CE-CERT Facilities Unique & Exceptional

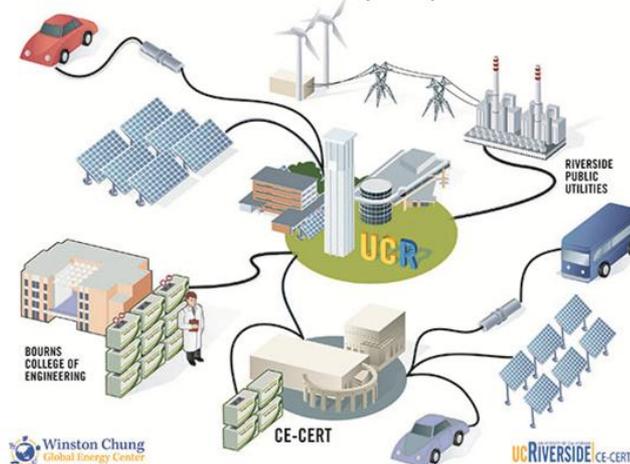
ATMOSPHERIC  
CHAMBER & TESTING  
The Only One of Its Kind



HEAVY DUTY CHASSIS  
DYNAMOMETER & TESTING  
LABORATORY



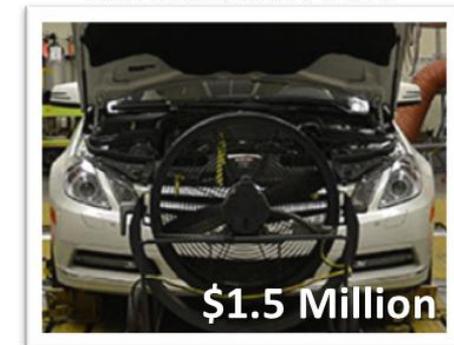
SUSTAINABLE INTEGRATED  
GRID INITIATIVE (SIGI) TESTBED



HEAVY DUTY ENGINE  
DYNAMOMETER & TESTING  
LABORATORY



LIGHT DUTY VEHICLE  
CHASSIS DYNAMOMETER &  
TESTING LABORATORY



Winston Chung  
Global Energy Center

UC RIVERSIDE CE-CERT

# Benefits at UCR: Education

- ▶ Pipeline
  - ▶ Access to Career Center
  - ▶ Interns Masters in Public Policy
- ▶ Educational Opportunities\*
  - ▶ Scholarships for admitted undergraduates
  - ▶ Scholarships for Masters programs in SoBA
  - ▶ Masters online courses in Engineering
  - ▶ Creation of education programs CARB and AQMD

# Benefits at UCR: Transportation

- Access to current and expanding transit resources\*
  - Access to Metrolink Perris-Valley Line
  - UCR trolley
  - Vanpooling
  - Zip cars



# Benefits at UCR: (fees may apply)\*

## ➤ Access to Campus Resources\*

- Student Recreation Center
  - gym, pool, tennis courts, etc.
- Child Development Center
- Schools First Credit Union
- Campus Restaurants and Catering
- Meeting rooms and other event venues
- Performing Arts events
- Bookstore
- Libraries
- Lectures/Symposia



# Technical Resources & Collaborations

- ▶ Access to facilities
  - ▶ Research Equipment (CE-CERT, TEM, NMR, MassSpec)
  - ▶ Libraries
  - ▶ Conference
  - ▶ 100Gbs Internet
  - ▶ Computer Cluster
  - ▶ Collaborations
  - ▶ Senior Projects
  - ▶ Research Projects
  - ▶ Research Colloquium
  - ▶ Adjunct Faculty Positions
  - ▶ CARB scientists to serve on Ph.D. Committees

