UCR

Chemical and Environmental Engineering

VIRTUAL OPEN HOUSE

Master's Program Admissions

TUESDAY, FEBRUARY 2, 2021

Apply to CEE!

CELEBRATING 30 YEARS

UCR Marlan and Rosemary Bourns College of Engineering

Agenda

Welcome: Prof. David Cocker, Chair

Graduate Admissions: Prof. Ian Wheeldon

Program Overviews

- ***Biotechnology*:** Prof. Ian Wheeldon
- ***MSOL Water Quality*:** Prof. Jinyong Liu
- ***Air Quality Masters*:** Prof. Don Collins

Moderated Q&A: Faculty Panel

Close

Welcome!

Prof. David Cocker, Chair

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UCR and College of Engineering

America’s fastest rising university – U.S. News

BEST IN EDUCATION & OPPORTUNITY

No. 1 Top performer in **social mobility** in the nation; U.S. News, 2021

TOP 1% Of universities **worldwide**; Center for World University Rankings, 2019-20

TOP 35 **Best value** public colleges in America; Money Magazine, 2020

BEST VALUE UNIVERSITY

TOP 12 **Public universities** in the nation; Forbes, "America's Best Value Colleges"

No. 14 U.S. college that pay off the most in 2020; CNBC Make It, 2020

TOP 20 America's **best value** colleges among public universities; Princeton Review, 2020

HIGHLY RANKED ENGINEERING COLLEGE

TOP 50 **Public engineering college** in the nation; U.S. News, 2021

No. 20 Best **global university** for engineering; U.S. News, 2021

No. 31 Best school of engineering majors by **salary potential** in the U.S.; Payscale 2020 College Salary Report

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Graduate Admissions

Prof. Ian Wheeldon

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CEE By the Numbers

388

Undergraduate Students

84

Graduate Students

21

Tenured/Tenure Track Faculty

6

Young Investigator Awards

$600K

Extramural funding per PI

330%

Increase in extramural funding since 2013

91%

Increase in faculty since 2011

50%

Increase in graduate students since 2012

The CEE Difference

Our Department

- Dynamic and highly productive faculty
- Multi-disciplinary research and collaborative projects
- Well-supported infrastructure, laboratory research facilities, and **4** research centers
- Outstanding colloquium series

Our Graduate Program

- Joint Chemical and Environmental Engineering graduate program
- Offering M.S. degrees in Industrial Biotechnology, air quality, and water quality systems engineering
- Five-year B.S. + M.S. accelerated degree offered for UCR undergraduate students

Living in Riverside, California

Small-town charm, BIG on opportunity

Within one hour from:

Hollywood


Beaches


Mountains


Disneyland


Palm Springs


Wineries


Apple Orchards


Hot Springs


Mission Inn


Shopping


Hiking Trails

PLUS: Within driving distance to: San Diego, San Francisco, Joshua Tree National Park, and Las Vegas!

Biotechnology Master's

Prof. Ian Wheeldon

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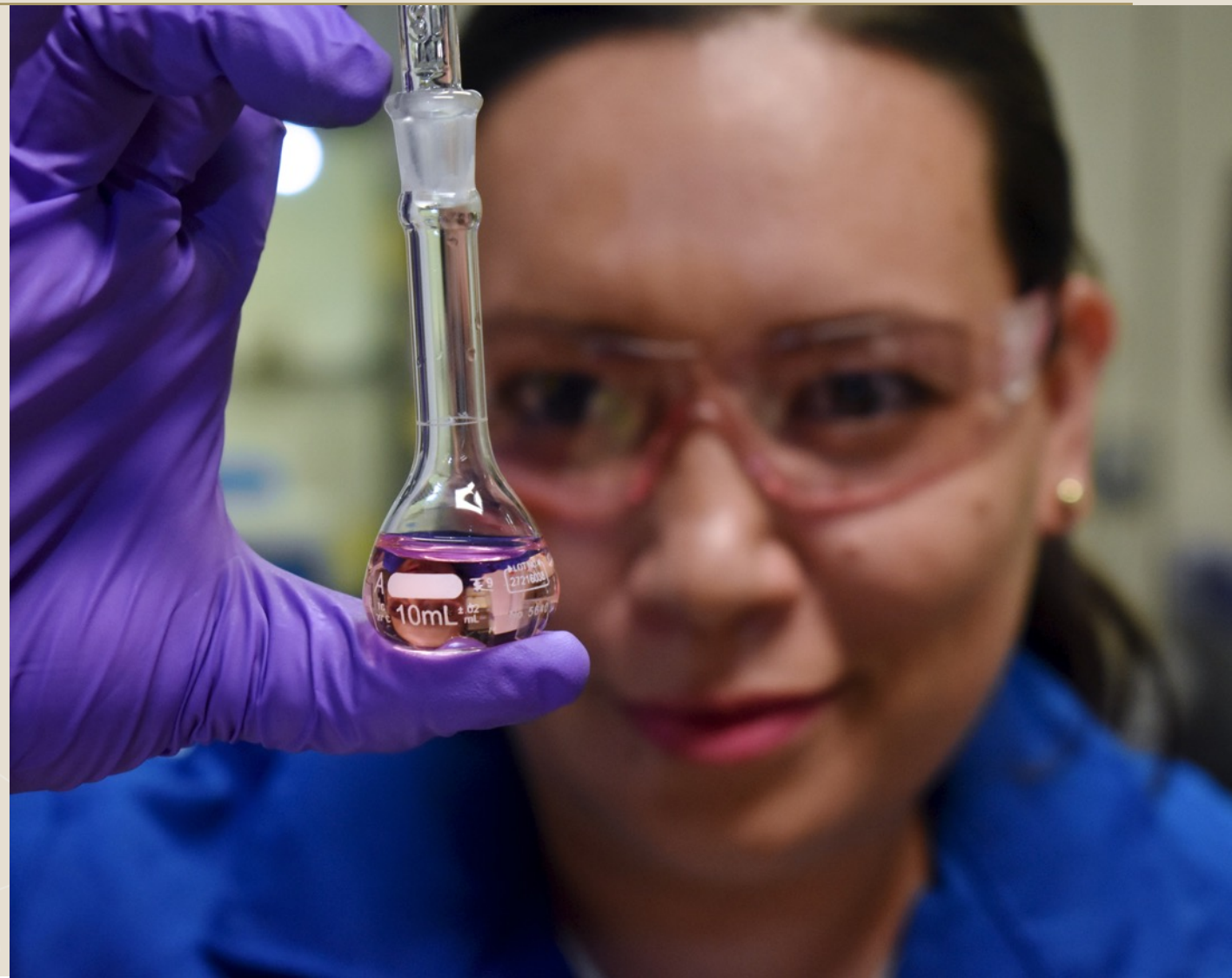
PROFESSIONAL SCIENCE MASTER'S IN INDUSTRIAL BIOTECHNOLOGY

NEXT-GEN BIOTECH EDUCATION

- M.S. in as few as 9-12 months
- One of only a few programs training biotech & bio-pharmaceutical skills
- Four focus areas
- Distinguished faculty interaction
- Biotech career prep in research, development, and production

INNOVATIVE DUAL EDUCATIONAL APPROACH

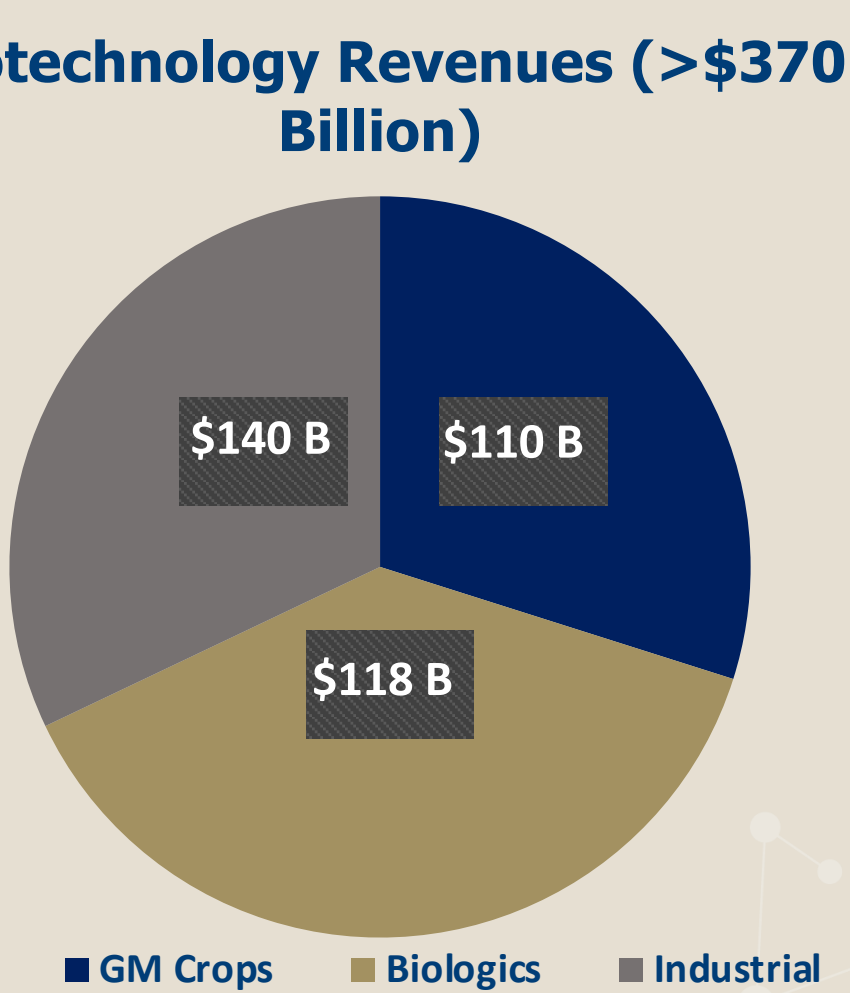
- Class and lab instruction
- Industrial internships
- Undergraduate mentoring
- Built-in CIB research training

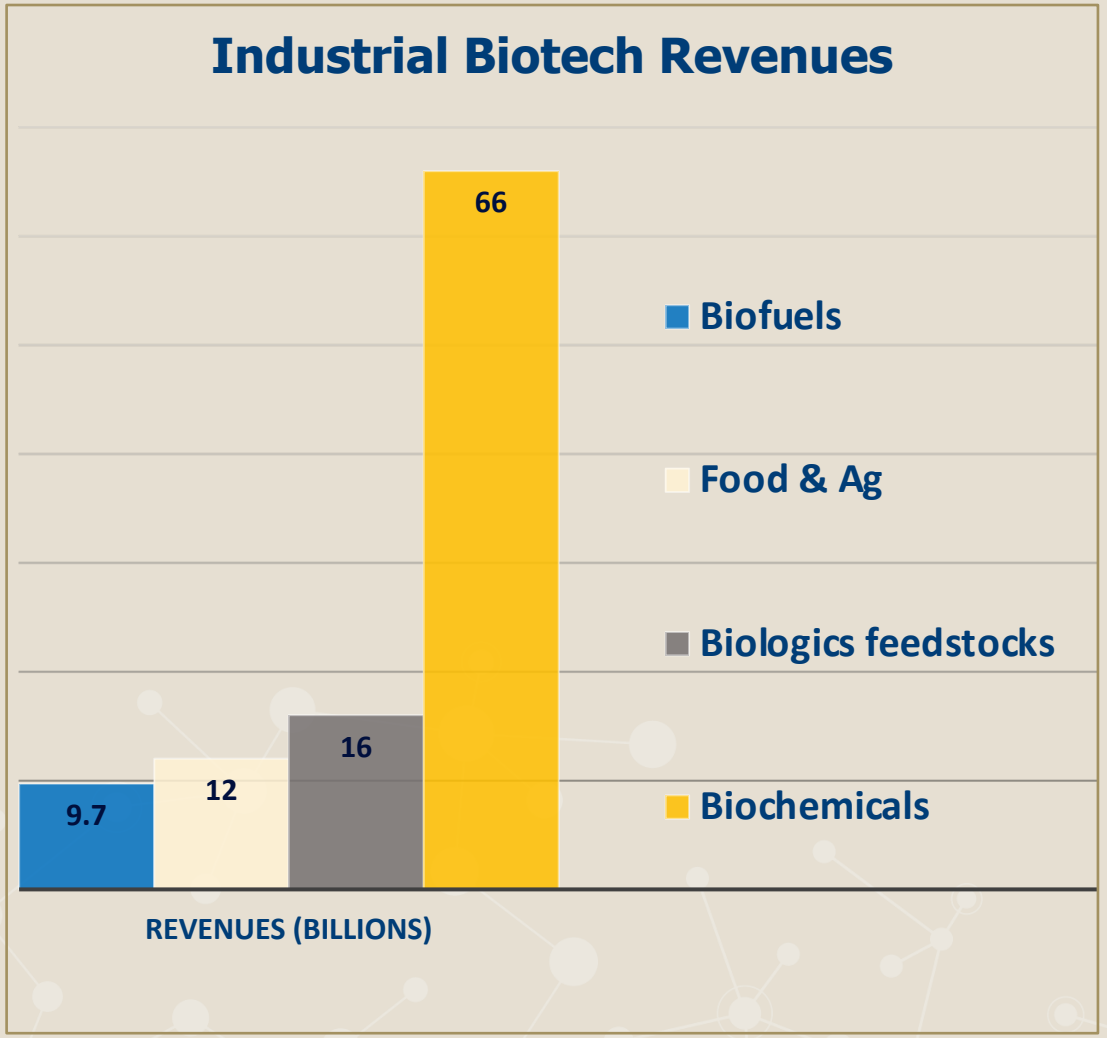


INDUSTRIAL BIOTECHNOLOGY

HEALTH	FOOD & AGRICULTURE	BIOFUELS	INDUSTRIAL
• **Reduces** rates of infectious disease • **Minimizes** health risks and side effects through tailored treatments	• **Generates** higher crop yields with fewer inputs • **Improves food** and crop oil content for cardiovascular health	• **Cuts** greenhouse gas emissions by 52% or more • **Reduces** fossil fuel dependence	• **Lowers** the temperature for cleaning clothes, potentially saving $4.1B annually • **Produces** biodegradable plastic alternatives

INDUSTRIAL BIOTECHNOLOGY IS A LARGE AND GROWING SECTOR OF THE US ECONOMY





INDUSTRIAL BIOTECHNOLOGY IN CALIFORNIA

1 YEAR MS CURRICULUM IN INDUSRIAL BIOTECHNOLOGY

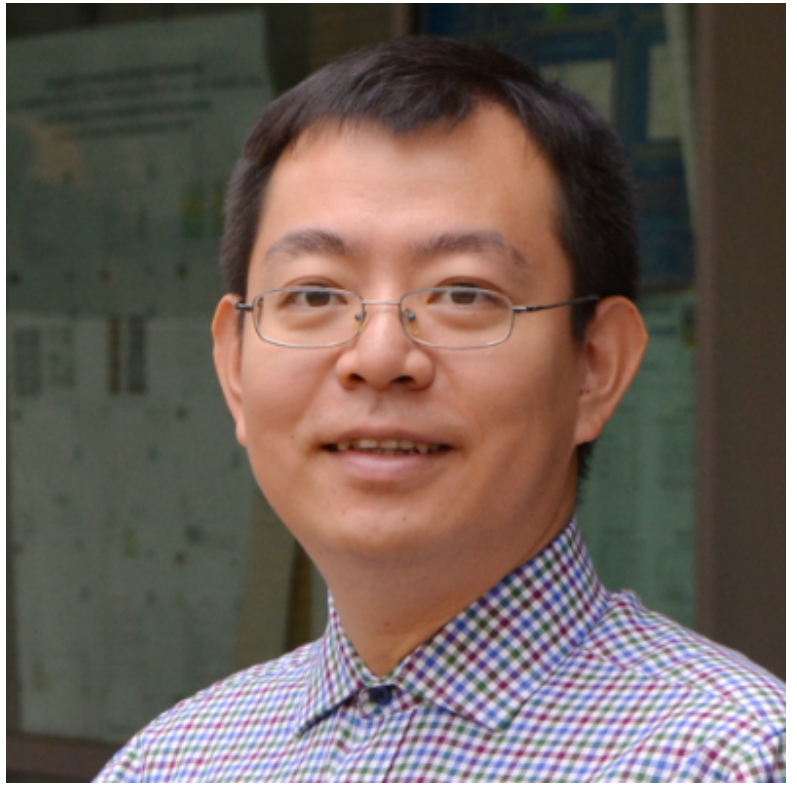
Fall Quarter	Winter Quarter	Spring Quarter	Summer Quarter
CHE 124 Biochemical Engineering Principles	CEE 212 Bioseparations	CEE 210 Cell Engineering	CEE 298i Industrial Internship (6-8 weeks)
CHE 124L Biochemical Engineering Lab	CEE 211 Upstream Processes in Biotechnology	CEE 248 Quantitative Analysis of Upstream	
CEE 236 Energy: Production, Uses, Economics, and Sustainability	CEE 238B Bioprocess Design Laboratory II	CEE 238C Bioprocess Design Laboratory III	
CEE 238A Bioprocess Design Laboratory I	CEE 286 CEE Seminar	CEE 286 CEE Seminar	
CEE 286 CEE Seminar			

Legend

- Process design and analysis
- Core lecture material
- Wet lab course

MSOL: Water Quality Systems Engineering

Prof. Jinyong Liu



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Environmental Engineering Systems (Water)

- Explore the science and engineering principles essential to providing clean water and improving the natural environment

- This specialization incorporates elements of water treatment and chemistry, covering topics such as **water systems fundamentals**, **physical and chemical processes**, **biological treatment**, and **advanced technologies**

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Curriculum

Course Prefix	Course Name	Credit Hours
ENGR 200	Engineering in the Global Environment	4
ENGR 201	Technology Innovation and Strategy for Engineers	4
ENGR 202	Introduction to Systems Engineering	4
ENGR 203	Principles of Engineering Management	4
CEE 241	Water Chemistry in Natural and Engineered Systems	4
CEE 225	Physical and Chemical Separation Processes	4
CEE 226	Biological Treatment Processes	4
CEE 243	Advanced Treatment Technologies	4
ENGR 296 A, B, C, D	Project Design Course A, B, C, D	4 – 1 credit courses

Curriculum

CEE 241 **Water Chemistry**
Chemical principles and advanced calculation for acid-base equilibrium, metal-ligand coordination, solid precipitation-dissolution, redox chemistry, reaction kinetics

CEE 225 **Physical and Chemical Processes**
Water treatment: coagulation-flocculation-sedimentation-filtration; disinfection; water softening; membrane filtration

CEE 226 **Biological Processes**
Wastewater treatment: microbial principles, BOD removal, nutrient removal, sludge treatment, energy and resource recovery

CEE 243 **Advanced Water Treatment Technologies**
Materials and modeling for absorption, ion-exchange, and membrane technologies; advanced oxidation and and reduction methods; treatment train systems; case studies and project design on PDFAS treatment, nutrient control, catalyst development, and critical thinking on frontier research and development

Faculty Members

Prof. Haizhou Liu

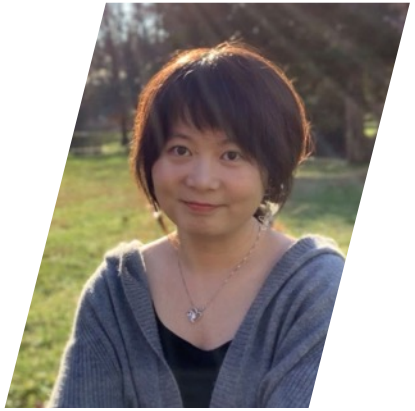
- Water treatment and reuse
- Advanced oxidation
- Disinfection byproduct control
- Heavy metals in water distribution systems

Prof. Yujie Men

- Fate, transport and bioremediation of emerging organic contaminants

Prof. Jinyong Liu

- Groundwater remediation
- Advanced reduction
- PFAS treatment
- Catalytic reduction of perchlorate



Prof. Yun Shen

- Pathogen transmission and control in built environment, water and food

Master's in Air Quality Engineering

Prof. Don Collins

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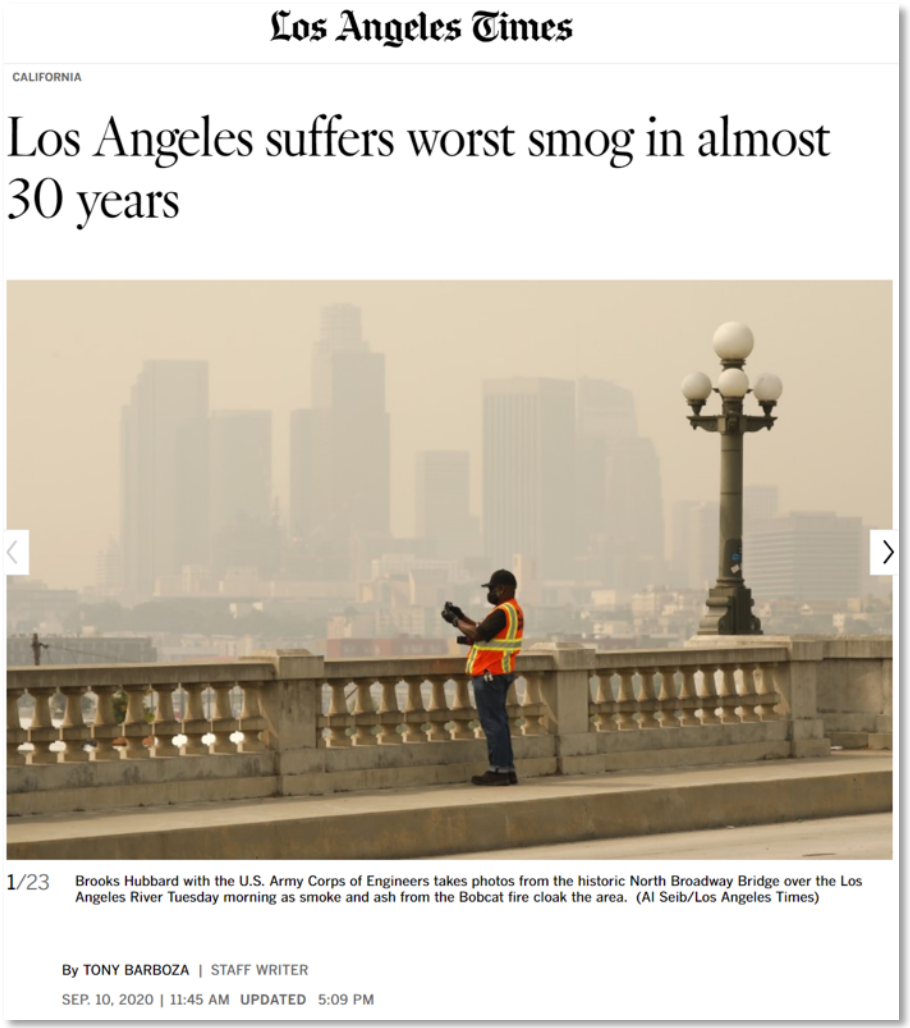
Curriculum

Department Courses	
CEE 136	Aerosol Technology
CEE 207	Air Quality Modeling
CEE 233	Advanced Air Pollution Control and Engineering
CEE 234	Vehicle Emissions Control Technology
ENVE 134	Technology of Air Pollution Control
ENVE 138	Combustion Engineering

Courses Outside of the Department	
ENSC 245	Chemistry and Physics of Aerosols
ME 136	Environmental Impacts of Energy Production and Conversion
PBPL 233	Environmental Economics and Policy

California air quality in the news



Los Angeles Times

CALIFORNIA

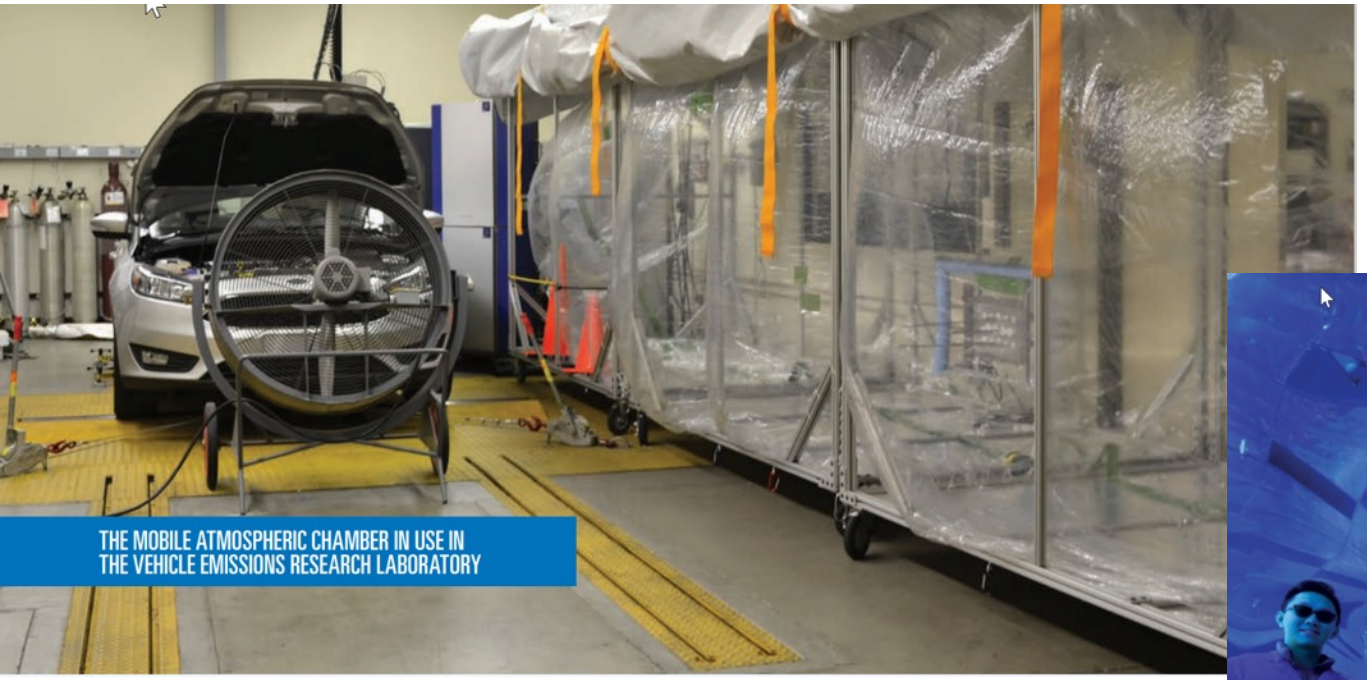
Los Angeles suffers worst smog in almost 30 years

1/23 Brooks Hubbard with the U.S. Army Corps of Engineers takes photos from the historic North Broadway Bridge over the Los Angeles River Tuesday morning as smoke and ash from the Bobcat fire cloak the area. (Al Seib/Los Angeles Times)

By TONY BARBOZA | STAFF WRITER

SEP. 10, 2020 | 11:45 AM UPDATED 5:09 PM

Air quality research we do in our labs

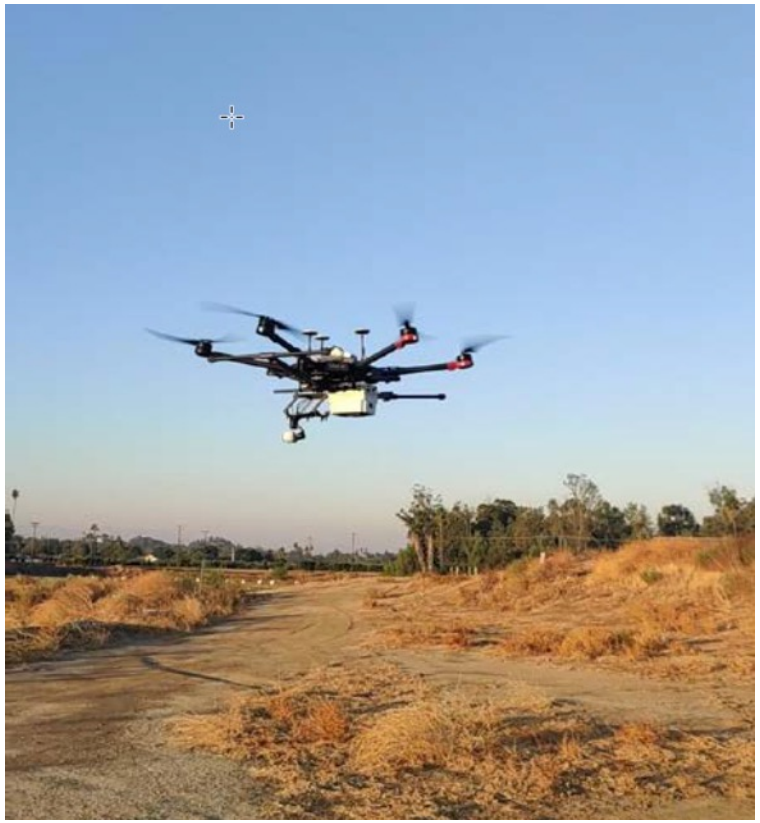


THE MOBILE ATMOSPHERIC CHAMBER IN USE IN THE VEHICLE EMISSIONS RESEARCH LABORATORY

David Cocker's group:

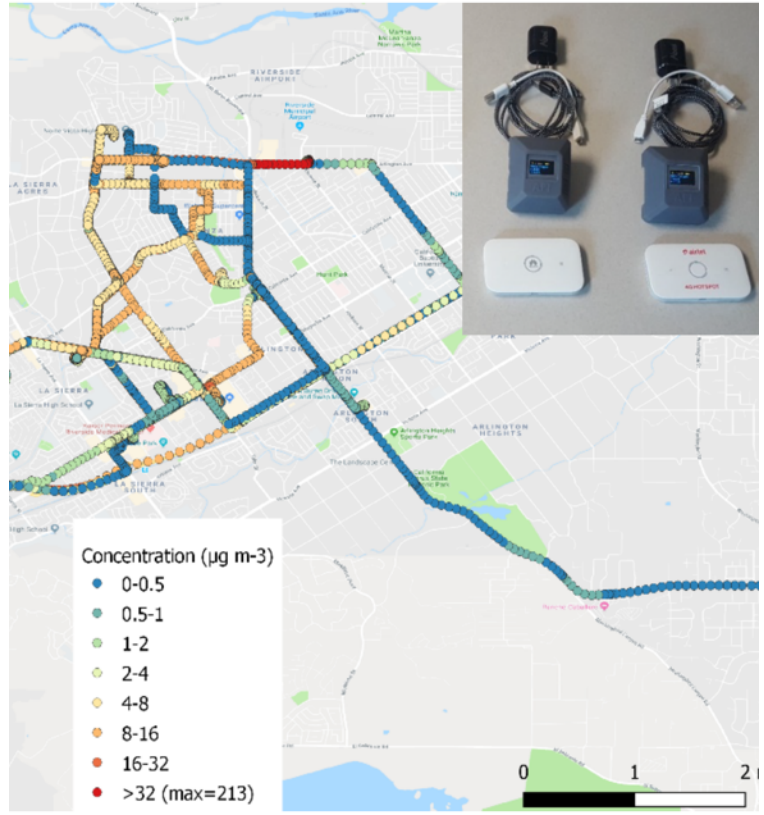
Uses large Teflon chambers to study pollutant formation from sources like cars and in the complex mixture of species found in the atmosphere.

Air quality research we do in the field



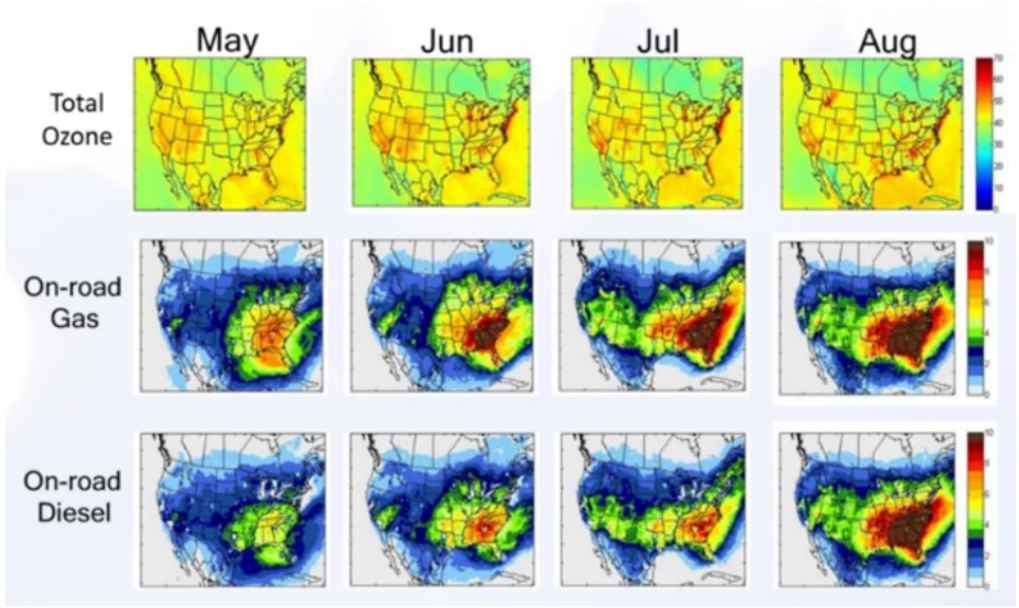
Don Collins' group:
Uses drones to measure ozone and other pollutants

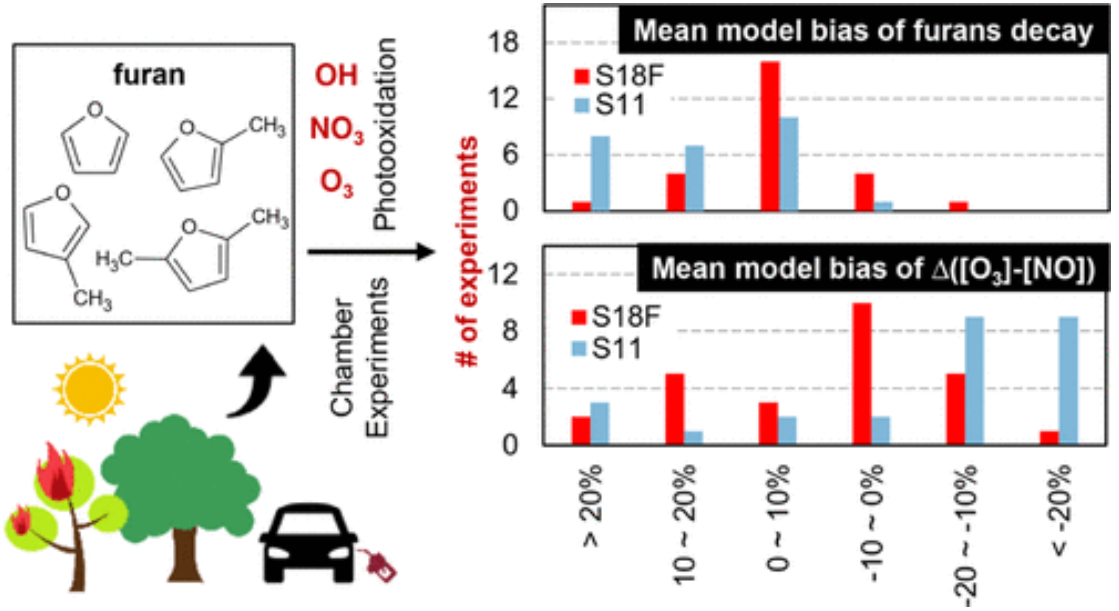
Kelley Barsanti's group:
Collects wildfire smoke samples from aircraft



Sunni Ivey's group:
Uses lightweight samplers to study personal exposure

Air quality research we do with our computers





Sunni Ivey's group:
Uses regional air quality models to simulate ozone formation and concentrations

Kelley Barsanti's group:
Uses laboratory data to improve simulation of atmospheric chemistry

Many, many others at UCR doing air quality research

Fundamental Interactions

J. Zhang
(Chemistry)

Davies
(Chemistry)

CALIFORNIA AIR RESOURCES BOARD

CARB-UCR MOU

Ensemble Dynamics

Bahreini
(Env. Sci.)

Cocker
(Chem. Env.)

Lin
(Env. Sci.)

H. Zhang
(Chemistry)

Collins
(Chem. Env.)

Barsanti
(Chem. Env.)

Environmental Interactions

Hopkins
(Env. Sci.)

Ivey
(Chem. Env.)

Li
(Env. Sci.)

Jung
(Mech. Eng.)

Porter
(Env. Sci.)

Allen
(Earth Sci.)

Increasing length scale and complexity

Molecular scale
Molecular and photon interactions
Chemical kinetics
Spectroscopy

Nanoscale to microscale
Aerosol chemistry and trace gas interactions
Particle formation
Aerosol composition

Local scale
Exposure
Health
Cloud interactions
Solar interaction

Urban scale
Emissions
Exposure
Health

Regional scale
Biomass Burning
Source Apportionment
AQ-Meteorology

Global scale
Transport
Climate and AQ
Remote Sensing

Diagram: J.F. Davies and C. Ivey

An exciting addition to our (almost) campus

CALIFORNIA AIR RESOURCES BOARD

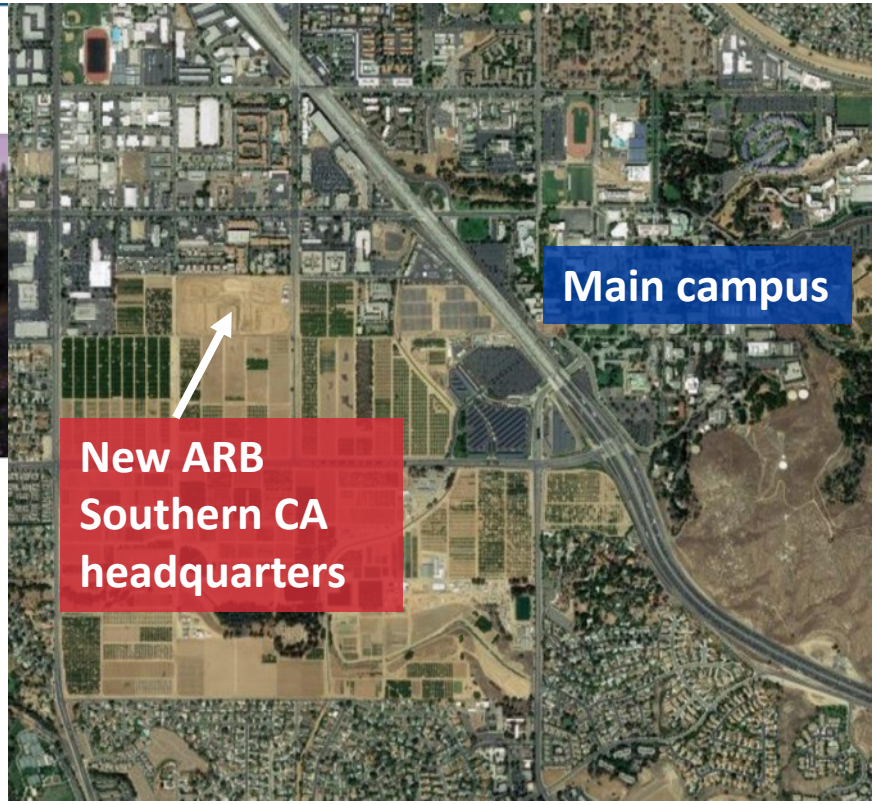
ABOUT OUR WORK RESOURCES SERVICES RULEMAKING NEWS EQUITY

Southern California Headquarters

CARB is building a new Southern California Headquarters

Under construction on a 19-acre site near the campus of UC Riverside, the approximately 380,000 square-foot facility will be one of the largest and most advanced vehicle emissions testing and research facilities in the world. It will also be the largest 'net-zero energy' structure (producing as much energy as it uses) of its type in the nation. The facility will also be designed to achieve Leadership in Energy and Environmental Design (LEED) Platinum certification and meet CalGreen Tier 2 standards. The facility is scheduled to be completed in early 2021.

"This striking design will make CARB's new Southern California headquarters an immediately recognizable landmark," said CARB Chair Mary D. Nichols. "It incorporates the highest standards of sustainability in the office and public spaces, and meets the exacting laboratory specifications we need to keep California at the forefront of our world-leading efforts to clean up our air and fight climate change."



An exciting addition to our graduate program for fall 2021*

Master's in Air Quality Engineering

- Non-thesis M.S. that can be **completed in 1 year**
- **16 units of core courses**
  - Air Quality Modeling
  - Advanced Air Pollution Control and Engineering
  - Vehicle Emissions Control Technology
  - Energy: Production, Uses, Economics, and Sustainability
- **16 units of electives** from list of 18 courses
- **4 units of internship and project**
  - ARB, AQMD, EPA, …

Online Master's in Environmental Engineering Systems (Air)

- Non-thesis M.S. that can be **completed in about 1 year**
- **16 units of core courses**
  - Air Quality Modeling
  - Advanced Air Pollution Control and Engineering
  - Vehicle Emissions Control Technology
  - Energy: Production, Uses, Economics, and Sustainability
- 16 units of professional engineering courses
- 4 units of professional project design course

* Pending final approval

Faculty Q&A Panel

Please submit your questions in the chat!

All specific admissions inquiries may be sent to **gradcee@engr.ucr.edu**.

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CONNECT WITH US

Chemical and Environmental Engineering

Website: www.cee.ucr.edu

Email: gradcee@engr.ucr.edu

Twitter: @CEEatUCR

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