Berkeley Climate Change Network

BERKELEY CLIMATE MAP — Industry JUNE 2025

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Scientists from Lawrence Berkeley Lab and a number of campus entities—including Engineering, Law, RCNR, L&S Physical Sciences, and Chemistry — are working on decarbonizing industry, often in collaboration with industry players. Topics include:

- Robotics
- Low hydrocarbon plastics
- Microbial processes
- Environmental economics
- Synthetic biology
- Nano and geosciences
- Sensors and actuators
- Cement production
- Supply chains
- Energy storage
- Energy markets
- Climate policies for industry
- Carbon trading
- Low carbon cement in China
- Concrete recycling
- MOFs for carbon capture from industrial emissions
- Political economy of industrial decarbonization
- Load flexing and smart products
- Industrial ecology
- Industrial adaptation to climate impacts
- Energy efficiency in industry

First	Last	Affiliation (primary)	Summary	Selected Projects/Reports/Classes
Alice	Agogino	Engineering-Mechanical Engineering	Mechanical Engineering, Intelligent learning systems, informational retrieval and data mining. CEO of Squishy Robotics CEEJ Affiliate	Advanced Methane emissions detection using drones and other tech – WINNING BCCAP proposal March 2025 NSF INCLUDES Alliance: Broadening Career Pathways in Food, Energy, and Water Systems with and within Native American Communities (Native FEWS Alliance), $8.1M coop agreement, 8/2021 Applications: Early detection of wildland fires; Early detection, characterization and remediation of methane in industrial plants.
Ken	Alex	Law - Center for Law, Energy and Environment	Director, Project Climate Project Climate is focused on moving promising climate solutions more quickly to policy and scale. *GrizzlyCorps* *Methane* *Low Hydrocarbon Plastics Standard Procurement* *Climate Break* *Trump Environmental Rollbacks* *Climate and Wildfire Institute* *Climate Corporate Risk Disclosure* *Trump Judges Project*	Runs the Subnational Methane Action Coalition (SMAC) on five continents with Gil Damon and Shivani Shukla Methane Frameworks for landfill, agriculture and oil-gas industry Methane Resource Library and Methane Times newsletter 2023 UCOP Proposal: Cutting Climate & Health Super-Pollutant Emissions through Next Generation Landfill Monitoring
Lisa	Alvarez- Cohen	Engineering – Civil and	Investigates microbial processes that can degrade environmental contaminants including methane	

		Environmental Engineering		
David	Anthoff	RCNR - ERG	Anthoff studies environmental economics and climate policy, developing integrated assessment models that inform industry-related climate strategies.	
Adam	Arkin	Engineering - BioEngineering	Studying systems and Synthetic Biology, Environmental Microbiology of Bacteria and Viruses, bioenergy, Biomedicine, Bioremediation, space	Director, Center for the Utilization of Biological Engineering in Space CUBES seeks to develop low energy/mass, autotrophic and regenerable in situ resource utilizing close-loop biomanufacturing processes for production of food, medicine and incidental building materials for operation in extreme, supply-chain limited environments. Lead Scientist, ENIGMA ENIGMA is a collaborative program to develop a predictive and mechanistic understanding of terrestrial subsurface bioprocesses for the control of major mineral cycles, fate of contaminants and restoration of sediment properties under the action of microbial communities. Lead PI, DOE Systems Biology Knowledgebase The KBase is a collaborative, open and extensible platform for the sharing of complex heterogeneous data, tools and analyses linked to the genomes of

				microbes, plants and other organisms of environmental and industrial interest.
Bhavna	Arora	LBNL - Energy Geosciences Division	Bhavna Arora is the Head of the Carbon Removal and Mineralization Program. Her research primarily involves reactive transport modeling to provide a comprehensive and predictive understanding of biogeochemical processes in various types of subsurface environments and at different space-time scales.	1) Increasing carbon storage and persistence in soils (RESTOR-C); 2) Enhanced weathering via soil amendments for negative C emissions; *3) Silicate Rock Amendments for Reduced Methane Emissions and Increased Carbon Storage in Rice Fields. A relevant paper: here*
Jill	Banfield	RCNR - ESPM, Innovative Genomics Institute	Geomicrobiology, environmental biogeochemistry, microbial community ecology and evolution Banfield Lab – Nanogeoscience Deputy Director, Microbiology, Innovative Genomics Institute	"Engineering the Microbiome with CRISPR to Improve our Climate and Health." Led by IGI Founder **Jennifer Doudna** and IGI's Microbiology Director **Jill** Banfield, the project is a collaboration of IGI, UC Davis, and UCSF and is funded by a $70M grant from The Audacious Project. One key area: Methane emissions reduction. Research Review in Plant and Microbial Biology - PLANTBI 292 007 (FALL 2023) How do soil microbial communities respond to global climate?

				Working in a large, long term, well replicated grassland climate change experimental system in the Angelo Coastal Reserve, CA, we are studying how microbial communities respond to predicted changes in rainfall timing and abundance. Specific questions include: (i) do different rainfall patterns alter microbial community membership? (ii) do above ground changes in vegetation correlate with, and drive, changes in subsurface consortia? (iii) how do communities vary with seasons, as the result of the first rain after the dry season, and as the result of extreme weather events?
	Berkeley Atmospheric Sciences Center	L&S Physical Sciences - Earth and Planetary Sciences	The Berkeley Atmospheric Sciences Center (BASC) is the hub for UC Berkeley's research on the science of the atmosphere, its interactions with Earth systems, and the future of Earth's climate Christie Boering, Director. Inez Fung, Co-Director. Bill Boos, Co-Director.	
	Berkeley Sensor and Actuator Center	Engineering	John Candelaria, Executive Director This Industry/University Cooperative Research Center (I/UCRC) is devoted to interdisciplinary engineering research on micro- and nano-scale sensors, moving mechanical elements, microfluidics, materials, and processes that take advantage of progress made in integrated-circuit, biological, and polymer technologies. BSAC includes a multi-disciplinary research team of 100+ graduate students and post-doctoral	BSAC Technology Seminar: The Climate Crisis is Here and Now, Damages Are Accelerating and BSAC's Skillsets Can Help.

			researchers led by more than ten BSAC Directors from the engineering faculties of electrical, mechanical, and bio engineering at UC Berkeley and UC Davis.	
Sebastien	Biraud	LBNL- Climate & Ecosystem Sciences Division	Climate Sciences Department, Head Biogeochemist at LBL where he leads the Climate Sciences Department. His work has taken him to the tropical rainforests of the Amazon, the great plains of the United States, and the Arctic tundra. Currently operating projects for DOE and other entities.	LBNL PI for the Undocumented Orphaned Well Program Monitoring: PI for Atmospheric Radiation Project (DOE) Monitoring: PI for SUper eMitters of Methane Detection Project AmeriFlux Management Project: Deputy and lead for Tech team In August 2022, a Berkeley Lab team led by EESA staff scientist Sébastien Biraud conducted on-road mobile surveys in Bakersfield, California, detecting elevated methane concentrations in a residential area. Using methane concentration data and isotope observations, they traced the source to a natural gas leak, which was promptly repaired by the local gas company. This project underscores the importance of community collaboration and environmental justice in addressing methane emissions
Kristie	Boering	Chemistry, EPS	Physical and Analytical Chemistry; Atmospheric Chemistry and Transport -- Chemistry and mass transport in Earth's and extraterrestrial atmospheres are studied through kinetics and photochemistry lab	

			experiments, modeling, and observations from high-altitude aircraft and balloons.	
Jonas	Borgel	Chemistry	Post-Doc in the Long Lab	Capturing Wellhead Gasses for a Profit and a Cleaner Environment
	California-China Climate Institute	Law	Fan Dai, Executive Director Jessica Gordon, Senior Climate Policy Fellow Jennifer Perron, Senior Climate Policy Fellow CCCI is led by former California Governor Jerry Brown and Vice Chair Mary Nichols. CCCI is a UC-wide initiative housed jointly at Berkeley Law — through its Center for Law, Energy & the Environment — and Rausser College of Natural Resources and partners with the Institute of Climate Change and Sustainable Development at Tsinghua University — one of China's preeminent research institutions. The Institute also works closely with other University of California campuses, departments and leaders. Launched in September 2019, CCCI was established to spur further climate action through joint research, training and dialogue in California and China. This Institute informs national policy makers, fosters dialogue and cooperation, and promotes the implementation of climate solutions at all levels.	China's Methane Action Update FEB 2025 Reducing Methane Emissions from the Solid Waste Sector: Lessons from California's Experiences (March 2023) This paper provides an overview of California's policies and implementation strategies aimed at mitigating waste methane emissions, and identifies policy gaps and recommendations for future action.

	Carbon Management Program	LBNL- Earth and Environmental Sciences Area	Multi-faceted program for carbon management. Carbon Monitoring and Measurement Margaret Torn Carbon Sink (soils) Margaret Torn Carbon Removal and Mineralization Bhavna Arora Carbon Storage David Alumbaugh Integrated Emissions Management (methane) Sebastian Biraud	Methane Emissions from Wetlands Increase at Higher Latitudes (Nature) - Qing Zhu and Kunxiaojia Yuan CARMEC Study: This study measures methane emissions from residential gas appliances to better understand their contribution to California's greenhouse gas emissions. Led by LBNL's Indoor Environment Group.
Fotini	Chow	Engineering- Civil and Environmental Engineering	Chow's research focuses on developing analytical and computational methods that help quantify climate change mitigation strategies, air quality effects, and cloud representation and feedback in regional climate models. Her current research projects include studies of wind turbine interactions with boundary layer dynamics over steep terrain, urban dispersion modeling, improved numerical turbulence techniques, topography representation, and grid nesting.	Research include large-eddy simulations and turbulence modeling to understand methane emissions and their dispersion in the atmosphere.
Gil	Damon	Law - Center for Law, Energy and Environment	Researching the methane policies of California and sub-nationals outside of U.S. with a focus on livestock and waste emissions. Damon contributed to CLEE's Methane Frameworks — practical guides to help governments develop strong methane strategies.	

Stephane	De la Rue du Can	LBNL	de la Rue du Can has co-authored reports on decarbonization strategies for the industrial sector, focusing on reducing emissions from the production of materials such as cement.	
	Energy Biosciences Institute	Campuswide	John Coates, Director The Energy & Biosciences Institute provides industrial sponsors access to world-class, collaborative research facilities across the energy, chemical, material sciences, data sciences, engineering, and agriculture sectors. Sponsorship opens access to our partner network of 7,500 faculty and principal investigators, and 100,000 student, postdoctoral, and professional researchers. Our team will help you to establish the most effective collaborative networks.	Research Overview: We direct and facilitate collaborative, cross-disciplinary research that leads to sustainable real-world solutions across the supply chain. Sponsors and researchers benefit from the inevitable synergies of such collaborations. The EBI's broad core research focuses on not only today's energy issues, but also those of the future generations, and the incremental steps in between. Every day, EBI researchers work to devise practical energy strategies and products that sequester carbon and shift the energy landscape while continuing to meet society's energy demands. The EBI's work focuses on three energy themes: diverse sources, unifying storage, and utilization.
Meredith	Fowlie	RCNR – ARE	Fowlie's research includes energy markets and climate change mitigation, focusing on how industrial sectors can adapt to and influence climate policies.	

Cynthia	Gerlein-Safdi	Engineering - Civil and Environmental Engineering	Water and Carbon Lab leader Water and Carbon Lab is a team of hydrologists and ecohydrologists interested in understanding the links between the water and carbon cycles at various temporal and spatial scales. As ecohydrologists, the team is interested in better understanding the link between carbon (CO2 or CH4) and water in different ecosystems. They do so by combining process-based modeling of vegetation, stable isotopes experiments, field experiments, and analysis of satellite data. They are specifically curious about the influence of climate change-induced shifts in water resources on the ability of plants to uptake carbon dioxide or for wetlands to produce methane.	Projects at UC research stations and other sites.
Barbara	Haya	Goldman	Director of the Berkeley Carbon Trading Project	Looking at methane emissions offsets
	Innovative Genomics Institute	Campuswide	Jennifer Doudna, Founder and Chair of the IGI Governance Board Brad Ringeisen, Executive Director The Innovative Genomics Institute believes in the potential of genome engineering to solve some of **humanity's greatest problems. The IGI is composed of diverse researchers at Berkeley and at UCSF.**	CRISPR for Climate Change Disease Resistant Crops Precision Microbiome Editing 2023 UCOP Proposal: Lab to Land California: Biotechnology for Accelerated Conservation and Climate Resilience

			Climate and Sustainable Agriculture Program Climate change, crop diseases, and hunger are intimately intertwined problems. We are using genome engineering as a tool to address all three. We are developing and deploying genome-editing technology to capture and sequester more greenhouse gases and to develop climate-friendly agricultural solutions for farmers in developing countries. Our focus is on those most vulnerable to a changing climate, and areas in agriculture that are underdeveloped by the commercial sector.	Grant: Technology Enabled Biological Carbon Capture and Sequestration- $21M, 8/2022 From California to Kenya: Sharing CRISPR Tools with African Scientists IGI Scientists Make Progress In Protecting Rice From Drought The Crop of the Future - Sorghum Grant: Technology Enabled Biological Carbon Capture and Sequestration- $21M, 8/2022
	Joint BioEnergy Institute	Campuswide		**Replacing Petroleum-Derived Plastics** LBL-led Joint BioEnergy Institute: Molecular biology, chemical engineering, computational and robotic technologies turn biomass into bioproducts.
Unique	Karki	LBNL	Karki conducts research to support climate resilience in the U.S. manufacturing sector, including projects on carbon abatement through energy efficiency and low-carbon fuels.	
Chengyao	Liang	Engineering, California China	Liang has conducted research on low-carbon pathways for China's cement industry, exploring	

		Climate Institute	technological advancements and policy frameworks to facilitate the transition to sustainable cement production. She is also developing cutting-edge new technologies for concrete recycling.	
Jiang	Lin	LBNL- Energy Technologies Area	Lin's research is focused on energy and climate policy, energy and emissions pathways with a focus on non-CO2 GHGs (methane, F-gas, etc.), electricity market and planning, low-carbon economic transition, and appliance efficiency issues in China. From 2016-2020, he was a co-Director of the Berkeley-Tsinghua Joint Research Center on Energy and Climate Change, a collaborative initiative between Berkeley Lab, the University of California-Berkeley, and Tsinghua University in China. From 2007-2016, Lin was the Director of the Energy Foundation's China Sustainable Energy Program (2007-2013) and Senior Vice President for Strategy and Analysis (2014-2016) where he managed the growth of Energy Foundation China into one of the largest international NGOs devoted to promoting clean energy and climate solutions in China. Before joining the Energy Foundation, Dr. Lin was previously at LBNL from 1994-2007, researching the Appliance Standards and China Energy Groups.	
Jeffrey	Long	Chemistry	Long leads the Baker Hughes Institute for Decarbonization Materials, focusing on developing advanced materials for carbon capture and storage -- such as metal–organic frameworks (MOFs), -- from	

			industrial emissions, including those from cement production. Researchers in Professor Long's group, Kurtis Carsch and Rachel Rohde have discovered a porous MOF material capable of capturing CO_2 at high temperatures typical of industrial exhaust streams, such as those from cement plants. This innovation addresses the challenge of carbon capture in high-temperature environments without the need for cooling, thereby enhancing the efficiency of CO_2 removal in cement manufacturing.	
Jonas	Meckling	RCNR	Meckling's research centers on climate and energy policy, with a particular emphasis on the political economy of industrial decarbonization and the role of industries in climate policy implementation.	
Samanvitha	Murthy	LBNL	Murthy's research encompasses load flexibility and smart products, contributing to industrial decarbonization strategies.	
Dipti	Nayak	L&S Biological Sciences - Molecular and Cell Biology	Nayak's lab studies a group of microorganisms called methanogens that produce the vast majority of methane released in the atmosphere. Some of their recent research is moving in the direction of identifying drug targets for an enzyme that catalyzes methane formation in these organisms that could then be fed to cows or introduced in rice paddies or wetlands to mitigate emissions from these key sources.	UCOP $100M Climate Action LOI lead – January 2023 - Rational Design of Small Molecule Inhibitors of Biomethanation in Livestock and Landfills -- Seed (Invite)

Kris	Niyogi	RCNR - Plant and Microbial Biology, Innovative	The lab's long-term research goals are to understand how photosynthetic energy conversion works in plants and eukaryotic algae, how it is regulated, and how it might be improved to help meet the world's needs for food, fuel, and carbon sequestration to fight climate change.	Plant Based CDR project Systems Analysis and Engineering of Biofuel Production in Chromochloris Zofingiensis, an Emerging Model Green Alga, $5.4M grant "Technology enabled biological carbon capture and sequestration." Chan Zuckerberg Initiative Foundation (Co-PI, with PI Brad Ringeisen and several other co-PIs). "Systems engineering of Auxenochlorella protothecoides: from photosynthesis to biofuels and bioproducts." Co-PI, with PI Sabeeha Merchant "RESTOR-C: RESTORation of soil Carbon by precision biological strategies." Co-PI, with PI Susannah Tringe
Dara	O-Rourke	RCNR – ESPM	O'Rourke focuses on sustainability transitions, industrial decarbonization, environmental justice, and industrial ecology. His work examines how industries can adapt to and mitigate climate change impacts.	Extensive work with Amazon and other companies
Prakash	Rao	LBNL	Serving as the Head of the Building and Industrial Applications Department at Berkeley Lab, Rao leads initiatives aimed at enhancing energy efficiency and reducing greenhouse gas emissions in industrial settings.	

	Red Seaweed Feed Supplement Research		Project led by UC Davis and UC San Diego researchers exploring the use of red seaweed as a feed supplement to reduce methane emissions from livestock. This study will connect with the Berkeley Carbon Trading Project at Goldman	
Robert	Rhew	L&S Social Sciences - Geography	Trace gas fluxes. Rhew's research includes trace gas biogeochemistry, effect of land cover on trace gas exchange, biosphere-atmosphere interactions, and atmospheric pollution. Our focus has been on three groups of Biogenic Volatile Organic Compounds (BVOCs): halocarbons, reduced sulfur gases, and light hydrocarbons. We are increasingly interested in the impacts that agriculture, invasive species, and fire management have on the atmosphere.	Communicating Climate Science (with Lawrence Hall of Science educators) NatRes24: Global Environment Theme House seminar (Fall and Spring)
Shivani	Shukla	Law - Center for Law, Energy and Environment	Researching the methane policies of California and sub-nationals outside of U.S. with a focus on livestock and waste emissions. Damon contributed to CLEE's Methane Frameworks — practical guides to help governments develop strong methane strategies.	
Whendee	Silver	RCNR - ESPM, Innovative Genomics Institute	Silver's work seeks to determine the biogeochemical effects of climate change and human impacts on the environment, and the potential for mitigating these effects. The Silver Lab is currently working on drought and hurricane impacts on tropical forests, climate change mitigation potential of grasslands, and greenhouse gas dynamics of peatlands and wetlands.	Silver is the lead scientist of the Marin Carbon Project, which is determining the potential for land-based climate change mitigation, particularly by composting high-emission organic waste for soil amendments to sequester atmospheric carbon dioxide. We are developing a mesh network of soil sensors for greenhouse gas monitoring in soils.

				Global observation gaps of peatland greenhouse gas balances: needs and obstacles - Biogeochemistry Soil carbon sequestration in global working lands as a gateway for negative emission technologies Carbon-sink potential of continuous alfalfa agriculture lowered by short-term nitrous oxide emission events - Nature Communications Compost amendment to enhance carbon sequestration in rangelands Assessing the climate change mitigation potential from food waste composting - Scientific Reports
Sarah	Smith	LBNL	Smith's work includes analyzing energy efficiency and emissions reductions in industrial processes.	
	SUMMATION PROJECT	LBNL	Initiative aims to reduce climate change by improving the detection and mitigation of methane emissions. . Focuses no pinpointing the locations of super-emitters and addressing intermittent sources using a network of observation towers. Led by Berkeley Lab, with partners at Pacific Gas and Electric, California Resources Corporation, California Air Resources Board, and the U.S. Environmental Protection Agency, the project's goal is to design a framework for fast, accurate methane emissions identification and monitoring in	

			California's Southern San Joaquin Valley, a high-emissions hotspot, and then expand it statewide.	
Margaret	Torn	LBNL - Biosphere-Atmosphere Interactions Program	Lead, Biosphere-Atmosphere Interactions Program Domain Her research includes: • Carbon sequestration • Human impacts on the carbon cycle – Climate change mitigation • AmeriFlux Management Project • Belowground Biogeochemistry Scientific Focus Area • Land-Atmosphere Interactions	
Susannah	Tringe	LBNL - Environmental Genomics & Systems Biology Division	Tringe is the Division Director, Environmental Genomics & Systems Biology Division **Mission**: Linking genome biology to ecosystem dynamics. Departments: BioSystems Data Science Comparative and Functional Genomics Molecular EcoSystems Biology	RESTOR-C: Center for the RESTORation of Soil Carbon by Precision Agricultural Strategies RESTOR-C will cultivate ways for plants and microbes to remove carbon dioxide from the atmosphere and stably store it for more than 100 years in the soil. Wetland microbiomes and GHG emissions
Dimitrios	Zekkos	Engineering	Methane emissions from landfills	
Nan	Zhou	LBNL	Zhou is a leading expert in energy efficiency, greenhouse gas mitigation, and sustainable energy systems, with a focus on industrial applications. Her work highlights strategies for reducing greenhouse gas emissions in industries like cement manufacturing.	

Rixin	Zhu	Law	Methane Policy Fellow at California-China Climate Initiative	
Quin	Zhu	LBNL	Research scientist who has analyzed data indicating a 9% increase in methane emissions from Boreal and Arctic wetlands over the past two decades, highlighting the impact of rising temperatures on these carbon-rich environments.	