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SUSTAINABLE LA
GRAND CHALLENGE
RESEARCH
SYMPOSIUM

WEDNESDAY, MAY 17, 2017

SUSTAINABLE LA GRAND CHALLENGE
TRANSFORMING LOS ANGELES
THROUGH CUTTING EDGE RESEARCH

GOAL

100% renewable energy,
100% locally sourced water, and
enhanced ecosystem and human health
in Los Angeles County by 2050.



Sustainable LA Grand Challenge Research Symposium
Wednesday, May 17, 2017
UCLA School of Law, Room 1357

8:30 AM - 9:00 AM	Check-in (Coffee and light pastries and fruit available)
9:00 AM - 9:15 AM	Welcome and Introduction <i>Ann Karagozian, Interim Vice Chancellor for Research and Mark Gold, Associate Vice Chancellor for Environment & Sustainability</i>
9:15 AM - 10:45 AM	Water Presentations & Snapshots
10:45 AM - 10:55 AM	Coffee Break
10:55 AM - 12:10 PM	Ecosystem Health Presentations & Snapshots
12:10 PM - 12:30 PM	Break for Lunch (Please return to presentation room with food)
12:30 PM - 2:00 PM	Energy Presentations & Snapshots
2:00 PM - 2:10 PM	Coffee Break
2:10 PM - 3:20 PM	Energy (continued) Presentations & Snapshots
3:30 PM - 4:00 PM	Breakout Sessions/ Brainstorming in Groups Energy – Rm 2357 Water – Rm 2467 Ecosystem Health – Rm 2448
4:00 PM - 4:15 PM	Breakout Sessions/ Group Summary Discussions
4:15 PM - 4:45 PM	Reconvene in Rm 1357 for Group Reports (snacks, wine and beer served)
4:45 PM - 5:00 PM	Closing Remarks
5:00 PM - 6:00 PM	Networking Wine & Beer Reception (continued in the courtyard)



WATER PRESENTATIONS

9:15 AM - 10:45

TOWARD THE ESTABLISHMENT OF A WATER BUDGET BASELINE AND WATER BALANCE MODEL FOR LOS ANGELES COUNTY

Presenter: Gonzalo Cortes | Civil & Environmental Engineering

Contributors: Steve Margulis (Civil & Environmental Engineering)

10 minute presentation

CALIFORNIA PRECIPITATION EXTREMES IN A WARMING WORLD

Presenter: Daniel Swain | Institute of the Environment & Sustainability

Contributors: Alex Hall (Atmospheric & Oceanic Sciences) and David Neelin (Atmospheric & Oceanic Sciences)

10 minute presentation

California's climate is intrinsically one of extremes, with wide swings between drought and flood. There are indications that a warming climate may bring even greater precipitation variability in California's future, but details regarding underlying physical processes and nuanced regional patterns of change remain uncertain. Our work seeks to explore the character of future changes in California precipitation extremes, with a particular focus on time-scales and spatial scales most relevant to regional climate adaptation.

NOVEL ANTI-FOULING FILTRATION MEMBRANE FOR SUSTAINABLE LOCAL WATER SUPPLY

Presenter: Dukwoo Jun | Chemistry & Biochemistry

Contributors: Richard Kaner (Chemistry & Biochemistry), Eric Hoek (Civil & Environmental Engineering), Shaily Mahendra (Civil & Environmental Engineering), and He Na (Chemistry & Biochemistry)

10 minute presentation

Since nearly 60-percent of water demand in Los Angeles County is satisfied with water sourced hundreds of miles away, securing sustainable local water supplies such as recycled water helps save enormous amounts of energy needed for water delivery. Although membrane filtration has significantly contributed to ensuring local water supplies, the energy efficiency of membrane filtration is commonly limited by membrane biofouling. Herein, we impart a commercial polyethersulfone ultrafiltration (PES UF) membrane with anti-biofouling properties by grafting hydrophilic polymers onto membrane surfaces. Photoactive perfluorophenyl azides (PFPAs) are used to covalently bind several hydrophilic polymer grafts to the PES membrane. The modified membranes possess higher hydrophilicity and exhibit outstanding fouling-resistance against an alginate foulant.

URBAN AGRICULTURE IN LOS ANGELES COUNTY: AN ASSESSMENT OF COMMUNITY ACCESS TO LOCAL FOOD

Presenter: Tyler Watson | Environmental Health Sciences

Contributors: Hilary Godwin, mentor (Environmental Health Sciences) and Rachel Surls (UC Cooperative Extension Los Angeles County)

10 minute presentation

Los Angeles County has recently promoted urban agriculture (UA) as one strategy to help improve healthy food access and food security. Currently, there is very little known about the extent and impact of UA in Los Angeles. This study begins to assess UA activity using semi-structured interviews and site visits with local stakeholders, geospatial analysis of existing UA sites, and policy analysis. Preliminary results show that very few UA sites are collecting data, existing UA sites are not located in high need communities in Los Angeles, and the community impact of UA may best be framed through social benefits.

THE WILSHIRE STUDY: DENSIFYING 1% OF LA COUNTY FOR 2050 SUSTAINABILITY

Presenter: Eui-Sung Yi | Architecture & Urban Design, The Now Institute

Contributors: Thom Mayne (Architecture & Urban Design), Annie Eby (The Now Institute), and Ryan Doyle (The Now Institute)

10 minute presentation

LA can accommodate the anticipated 1.5 million person population increase by 2050 by densifying less than 1-percent of its land. The Wilshire densification project analyzes the viability of three distinct urban growth scenarios, with a full demonstration study of a scenario which accommodates the 1.5 million population increase by preserving 99-percent of LA County by densifying 1-percent of land at a density similar to that of Manhattan, measuring the impact of densification on future sustainability. The Now Institute study includes a proposal to extend the purple Metro line and provide a high density, interconnected, urban community along Los Angeles' iconic Wilshire Corridor.

EVALUATION OF EFFECTIVE URBAN CONSERVATION EFFORTS

Presenter: Katie Mika | Institute of the Environment & Sustainability

Contributors: Mark Gold (AVC, Environment & Sustainability)

3 minute snapshot

Conservation is a critical component of moving LA towards a more locally sustainable water supply as reducing local demand for water in turn lowers the volumes of imported water which must be replaced with new local water supplies. However, there is a need to characterize the full universe of potential conservation options in order to identify the conservation practices which could best be implemented in LA (taking into consideration local climate, demand hardening due to previously implemented programs, etc). We aim to make recommendations detailing which of these best practices would be most suitable to implement under LA County's conditions.

GENDER AND EVERYDAY WATER USE IN LOS ANGELES

Presenter: Jessica Cattelino | Anthropology

Contributors: Viridiana Auger-Velez (Anthropology), Dalila Ozier (Anthropology), and Rachel Lee (English; Gender Studies)

3 minute snapshot

This ethnographic study of gender and household water use aims to illuminate how households make decisions about water use in everyday life, and whether these decisions are influenced by gender, race, and class.

CREATING A ONEWATER MARKET FOR LOS ANGELES: SUPPORTING THE GOAL OF 100% LOCAL WATER SUPPLY FOR COMMUNITY WATER SYSTEMS

Presenter: J.R. DeShazo | Public Policy; Urban Planning

Contributors: Gregory Pierce (Luskin Center for Innovation) and Nicholas Chow (Luskin Center for Innovation)

3 minute snapshot

This project will assess the feasibility of creating a unified water market for Los Angeles which must adapt to utilize 100-percent local water if the Grand Challenge is to be met. Water systems vary greatly in their capacity to adapt and in their potential for conservation. Therefore, the only way that they can achieve 100-percent local water is through a system that enables the trading of local water. Developing such an exchange platform will further incentivize water conservation and thus increase aggregate local supply at a lower cost than is feasible under the current system.

LONG-TERM VEGETATION CHANGE AND ITS IMPLICATIONS FOR THE WATER BALANCE OF THE LOS ANGELES BASIN

Presenter: Dennis Lettenmaier | Geography

3 minute snapshot

Efforts to increase urban vegetation and to reduce water use within the Los Angeles Basin (LAB) are apparently contradictory. Our project is reconstructing historical changes in vegetation in the LAB, and will use this knowledge to evaluate the water use implications of future land cover and vegetation scenarios. We intend to quantify the implications of these alternatives on the LAB water balance using a land surface hydrology model. Our project is intended to identify sustainable urban ecosystem management plans for the LAB, and has implications for growing urban areas elsewhere as well.

MODELING WATER SUPPLY AND LOCAL WATER RELIANCE ACROSS LA COUNTY: THE ARTES PROJECT

Presenter: Erik Porse | Institute of the Environment & Sustainability

Contributors: Katie Mika (Institute of the Environment & Sustainability), Elizaveta Litvak (University of Utah), Kim Manago (Colorado School of Mines), Kartiki Naik (Institute of the Environment & Sustainability), Madelyn Glickfeld (Institute of the Environment & Sustainability), Terri Hogue (Colorado School of Mines), Mark Gold (Institute of the Environment & Sustainability), Diane Pataki (University of Utah) and Stephanie Pincetl (Institute of the Environment & Sustainability)

3 minute snapshot

Los Angeles faces a likely future of reduced imports and greater reliance on local water supplies. We developed a network flow model, Artes, to answer systematic planning questions across the huge system of water resources management in LA, which includes agencies, groundwater basins, watersheds, treatment plants for wastewater and recycled water, and stormwater capture basins. Results from the open-source modeling platform are the first to show system-wide tradeoffs in demand, supply, groundwater overdraft, and local water supply goals.



10:55 AM - 12:10 PM

PHYSICAL ACTIVITY THROUGH SUSTAINABLE TRANSPORT APPROACHES (PASTA)

Presenter: Michael Jerrett | Environmental Health Sciences

Contributors: Christina Batteate (Environmental Health Sciences) and Jonah Lipsitt (Environmental Health Sciences)

10 minute presentation

The PASTA project is a longitudinal study to evaluate infrastructure initiatives in LA. It aims to understand correlates of active mobility and their effects on overall physical activity, injury risk, and exposure to air pollution. The study gathers data from participants using three methods: a smartphone-based mobile sensing application (MOVES) that detects routes and activity-type; a web-based travel survey; and wearable GPS and accelerometer devices. Public enrollment began in early May with data collection concluding in December 2017. Other mobile sensing and remote applications in-development will also be discussed.

INSIGHTS FROM THE RECENT CALIFORNIA DROUGHT ON THE FUTURE OF THE GREATER LOS ANGELES REGION: A REMOTE SENSING AND GEOSPATIAL ENVIRONMENTAL ANALYSIS

Presenter: Glen MacDonald | Geography

Contributors: Chunyu Dong (Geography), Rich Ambrose (Environmental Health Sciences), Tom Gillespie (Geography), Greg Okin (Geography) and Phil Rundel (Ecology & Evolutionary Biology)

10 minute presentation

MODIS satellite data and geospatial environmental data are used to analyze impacts of the 2012-2016 drought on Los Angeles area vegetation as a scenario for future conditions under climate change. Vegetation experienced striking browning, especially in winter 2014. Overall greenness had not recovered to previous levels by 2016. Southern coastal-zone vegetation demonstrated exceptional browning compared to other California vegetation zones. Local environmental factors such as soil type, elevation and climate (except aspect) influenced the sensitivity of vegetation. Increased fire in drought-sensitive vegetation is a concern and the location of energy infrastructure relative to sensitive vegetation settings is now being assessed.

THE IMPACT OF HEAT WAVES ON NATIVE VEGETATION IN SOUTHERN CALIFORNIA

Presenter: Ulli Seibt | Atmospheric & Oceanic Sciences

Contributors: Lawren Sack (Ecology & Evolutionary Biology), Alexandria Pivovarovoff (UCLA La Kretz Center for California Conservation Science), Wu Sun (Atmospheric & Oceanic Sciences), Katja Grossmann (Joint Institute for Regional Earth System Science & Engineering), Phil Rundel (Ecology & Evolutionary Biology), Ariel Pezner (Atmospheric & Oceanic Sciences) and Alejandra Pesqueira (Atmospheric & Oceanic Sciences)

10 minute presentation

The LA region is projected to experience both significant warming and increased heat wave frequency under climate change. Native plants are well adapted to the seasonal summer drought, but heat waves may place additional stress on vegetation. Using data on plant carbon and water fluxes collected from three native plant species, we found that heat waves suppress photosynthesis and reduce water use efficiency - the ratio of carbon uptake vs water loss. The frequent heat waves predicted for the end of the century thus pose a great threat to shrubland ecosystems in southern California.

BIODIVERSITY ATLAS FOR LOS ANGELES

Presenter: Thomas Gillespie | Geography

Contributors: Ryan Harrigan (Institute of the Environment & Sustainability), Monica Dimson (Geography), Shenyue Jia (Geography) and Tom Smith (Ecology & Evolutionary Biology)

10 minute presentation

The Biodiversity Atlas contains environmental and biodiversity data related to sustainability in Los Angeles. It contains biodiversity maps for native species and high resolution endangered species maps to insure zero extinction. The on-line Atlas will show real time maps of species distributions and diversity (e.g. birds), biodiversity hotspots, corridors, and near real time climate, phenology, and diseases maps (e.g. shot hole borer). This project focuses on communicating data, ideas, and themes related to biodiversity to a large local audience. Results can easily be updated and scaled up to any county in California, the state of California, and nationally.

COEXISTING WITH LA'S NESTING RAPTORS AND WATERBIRDS

Presenter: Dan Cooper | Ecology & Evolutionary Biology

Contributors: Daniel Blumstein (Ecology & Evolutionary Biology) and Pamela Yeh (Ecology & Evolutionary Biology)

3 minute snapshot

Raptors and colonial waterbirds are large, charismatic species at the top of the food chain. Both groups had human-driven population crashes a century ago. While a subset of these species are urban tolerant and have recovered in the LA area, others are apparently not tolerant of human activities and have not. We intend to conduct a historical analysis of these two groups in the area to identify both tolerant and intolerant species, and to identify filtering processes related to urbanization. Later, we will create a database of behavioral and ecological traits that can be used to rank species in terms of their tolerance to various types of human disturbances. This database can be expanded as more data are collected and will be immediately useful for ongoing management both in response to expected changes in water regimes and as LA expands to accommodate its growing population.

URBAN ECOLOGY OF LOS ANGELES MAMMALS: BIODIVERSITY, PATHOGEN RISKS, AND PUBLIC PERCEPTIONS

Presenter: Jessica Lynch Alfaro | Institute for Society and Genetics

Contributors: Jamie Lloyd-Smith (Ecology & Evolutionary Biology), Christopher Kelty (Institute for Society and Genetics), Anthony Friscia (Integrative Biology and Physiology), Katie Prager (Ecology & Evolutionary Biology) and Sarah Helman (Ecology & Evolutionary Biology)

3 minute snapshot

The LA Mammals project has four main objectives: (1) To map urban mammal biodiversity for the Biodiversity Atlas for LA through live and camera trapping, and through accessing databases from around the city; (2) To characterize population dynamics, population history, and gene flow in the city for key abundant species using population genomics; (3) To assess locally abundant mammalian wildlife for pathogens potentially harmful to humans, pets, and other wildlife species; and (4) To understand mammalian urban ecology and ecosystem services, as well as humans' perception of the values and risks of contact with urban wildlife, by interviewing diverse local experts.

TERAHERTZ LASER LEAF SCANNER TO REDUCE URBAN ECOSYSTEM WATER EXPENDITURE

Presenter: Lawren Sack | Ecology & Evolutionary Biology

Contributors: Mona Jarrahi (Electrical Engineering) and Benjamin Williams (Electrical Engineering)

3 minute snapshot

We aim to catalyze discovery, technology development and applications to strongly reduce irrigation water expenditure in the urban ecosystem. We are developing a new instrument and sensor to rapidly determine the water status of plants, enabling only the use of water required for the survival and growth of plants. We will design a hand (or drone) held instrument for measuring water content within leaves for lawns or urban trees, and a sensor that can be deployed for automated measurements to interface with irrigation systems for residential and commercial landscapes, street trees, arboreta, parks and campuses.



ENERGY PRESENTATIONS

12:30 PM - 2:00 PM

ENERGY GENERATION AND STORAGE REQUIREMENTS FOR A SUSTAINABLE LA BY 2050

Presenter: Richie Wirz | Mechanical & Aerospace Engineering

Contributors: Karthik Nithyanandam (Mechanical & Aerospace Engineering) and Parker Wells (Mechanical & Aerospace Engineering)

10 minute presentation

To provide a roadmap towards 100-percent energy sustainability for Los Angeles by 2050, we have balanced projected end user needs with accessible renewable energy resources, distribution, and storage capabilities in the LA region. The results show that a fully renewable LA in 2050 is clearly feasible using the region's natural resources. The talk will conclude by outlining key challenges in policy, technology, and economics that must be pursued to make it a reality.

UTILITY MODELS IN LOS ANGELES AND THEIR ROLE IN A SUSTAINABLE ENERGY FUTURE

Presenters: Ann Carlson | Law and William Boyd | Law, University of Colorado

10 minute presentation

We are using LADWP and SCE as case studies to evaluate their efforts to transform the electricity system in the region to a renewable future with an electrified grid. These two utilities are governed under very different governance models and face different constituencies, regulatory authority and funding structures. Our aim is to see whether and how already enacted policies are being implemented on the ground, whether the policies are working, are in need of reform or could be enhanced. But we also aim to see whether new policies are needed to help speed the transition. We are particularly interested in studying the organizational forms of the two LA-based utilities, the IOU (investor-owned utility) and the municipal utility, the legal and political systems within which they operate, and the challenges and opportunities of using these two models to green the LA power grid.

TANDEM PHOTOVOLTAIC-BATTERY DEVICE FOR NEXT GENERATION CONCOMITANT ENERGY HARVESTING AND STORAGE

Presenter: Bruce Dunn | Materials Science & Engineering

Contributors: (Materials Science & Engineering), Kevin Daly (Architecture & Urban Design), David Ashby (Materials Science & Engineering), Nick De Marco (Materials Science & Engineering) and Ryan DeBlock (Materials Science & Engineering)

10 minute presentation

The research objective for this project is to develop a tandem device capable of providing both energy generation and storage by combining the functions of a photovoltaic and a rechargeable battery. Although both systems individually have been studied in depth and successfully developed, a tandem device has yet to be explored. In our work to date, we successfully used the power from one of our perovskite solar cells to charge a flexible lithium-ion battery.

ADVANCED ENERGY FOR DISADVANTAGED COMMUNITIES

Presenter: Felicia Federico | Institute of the Environment & Sustainability

Contributors: Stephanie Pincetl (Institute of the Environment & Sustainability), Eric Fournier (Institute of the Environment & Sustainability), Erik Porse (Institute of the Environment & Sustainability), Rhianna Williams (Institute of the Environment & Sustainability), Alex Ricklefs (Institute of the Environment & Sustainability), Yating Chuang (Institute of the Environment & Sustainability) and Magali Delmas (Institute of the Environment & Sustainability)

5 minute presentation

The CCSC is recipient of a planning grant from the CA Energy Commission to design an Advanced Energy Community (AEC) in a disadvantaged area of unincorporated LA County. The AEC will be a community-scale zero net energy (ZNE) demonstration project, and represents an innovative model for engaging communities in planning and implementing future energy systems that provide reliable, resilient, integrated local energy solutions. Our project team includes the County of Los Angeles, The Energy Coalition, Day One, and the LA Cleantech Incubator.

ZONING ENERGY

Presenter: Heidi Alexander | Architecture & Urban Design

Contributors: Dana Cuff, mentor (Architecture & Urban Design)

10 minute presentation

This project is concerned with projective critical historical analysis of the concurrent development of land use regulation and urban energy systems in Los Angeles. Findings imply direct and sustained reciprocal conditions linking land use and development to energy production, consumption, allowable hazardous use proximity, and energy culture at large, with acute contrast between neighborhoods of varying economic and racial demographics. This project observes powerful latent productive potential in the application of land use policy to the development of sustainable distributed energy systems in Los Angeles as an extension of the police power in the service of the General Welfare.

'GREENING' THE MIX THROUGH COMMUNITY CHOICE: TOWARD A 100% RENEWABLE ENERGY LOS ANGELES

Presenter: Sean Kennedy | Urban Planning

Contributors: Stephanie Pincetl, mentor (Institute of the Environment & Sustainability)

10 minute presentation

Community Choice Aggregation (CCA) allows local governments to set their own renewable energy targets and potentially deliver a greater range of renewable energy to their customers than would be provided by a traditional utility. This study assesses the potential of the CCA model to contribute to the Sustainable LA Grand Challenge goal of powering 100-percent of local energy and transportation needs with cleaner, renewable energy resources by 2050. While CCAs demonstrate potential to meet future renewable energy objectives as they mature, how these new entities will respond to ongoing policy uncertainty and potential supply constraints remains to be seen.

2:10 PM - 3:20 PM

LIFE CYCLE AND AIR POLLUTION IMPACTS ASSESSMENT OF TRANSPORTATION FUELS FROM ALTERNATIVE BIOMASS RESOURCES

Presenters: Deepak Rajagopal | Institute of the Environment & Sustainability and Suzanne Paulson | Atmosphere & Oceanic Sciences

10 minute presentation

Our project is aimed at assessing the local resource base and the potential life cycle environmental benefits of processing readily available biomass resources (other than purpose-grown feedstock) and algae for producing alternative types of fuels including ethanol, biodiesel, biojet, synfuels, and renewable natural gas. We have completed a detailed assessment of the quantity of different types of biomass available within California at three geographic scales: LA County, Southern California region and the state. We are also about to complete a meta-analysis of the literature to determine the state of the science on emissions from biodiesel derived from different feedstock.

LINKING TRANSPORTATION NETWORK COMPANIES WITH LOS ANGELES METRO

Presenter: Juan Matute | UCLA Institute of Transportation Studies

Contributors: Brian Taylor (Urban Planning)

10 minute presentation

The project examines the potential for a policy mechanism which links rapid transit and transportation network company (TNC) trips toward a goal of increasing Zero Emission Vehicle (ZEV) adoption and use, increasing LA County transit use, and reducing AM peak vehicle trips to worksites. The first two objectives support the UCLA Sustainable Los Angeles Grand Challenge goal of powering 100-percent of Los Angeles' energy and transportation needs with renewable energy sources by 2050. The third can help bring short-term air quality and congestion reduction benefits.



ENERGY PRESENTATIONS

SMART GRID VIA INTEGRATED DISTRIBUTED ENERGY RESOURCES COMBINING SOLAR PHOTOVOLTAICS, ELECTRIC VEHICLES, AND, BATTERY ENERGY STORAGE SYSTEMS

Presenter: Rajit Gadh | Mechanical and Aerospace Engineering

Contributors: Dean Curtis (Mechanical & Aerospace Engineering) and Rui Huang (Mechanical & Aerospace Engineering)

10 minute presentation

States such as California have seen a substantial rise in the amount of energy generated from solar photovoltaics (PV) on rooftops. These renewable energy resources, being intermittent, can potentially destabilize the grid when scaled up to the level of the entire grid. Electric vehicles (EVs) are being added at a significant pace in California thereby increasing the load on the grid. However, their batteries may be exploited as battery energy storage system (BESS) devices. Management and control of each of these distributed energy resources (DERs) is a major area of research for the UCLA Smart Grid Energy Research Center (SMERC).

ENVIRONMENTAL AND PUBLIC HEALTH BENEFITS FROM ACHIEVING SUSTAINABLE ENERGY IN THE LOS ANGELES COUNTY

Presenter: Yu Gu | Joint Institute for Regional Earth System Science & Engineering

Contributors: Yifang Zhu (Environmental Health Sciences), K.N. Liou (Atmospheric & Oceanic Sciences), Michael Jerrett (Environmental Health Sciences), Hui Su (Jet Propulsion Laboratory), Tianyang Wang (Environmental Health Sciences), Ben Zhao (Joint Institute for Regional Earth System Science & Engineering) and Alex Hall (Atmospheric & Oceanic Sciences)

3 minute snapshot

Currently, much of LA County is out of compliance with the National Ambient Air Quality Standards for PM2.5 and ozone, which have been found to have adverse impacts on public health. In this project, we seek to investigate the potential environmental and public health benefits of replacing conventional fossil fuels with renewable energy in the LA County. We will utilize state-of-the-art methods to estimate the future emission trends under different renewable energy scenarios, simulate consequent changes in ambient PM2.5 and ozone concentrations, and assess their resulting public health benefits in LA County.

DEVELOPING iSLA SYSTEM FOR EFFICIENT ENERGY HARVESTING AND STORAGE

Presenter: Yongjie Hu | Mechanical & Aerospace Engineering

Contributors: Adrienne Lavine (Mechanical & Aerospace Engineering), Bruce Dunn (Materials Science & Engineering) and JR DeShazo (Public Policy; Urban Planning)

3 minute snapshot

Our project aims to demonstrate a high-performance and novel energy device comprised of an integrated energy harvesting and storage system. The innovative design maximizes the usage of the intrinsic spectral distribution of energy herein dubbed the Integrated Spectral Leverage Amplification (iSLA) system, to improve energy efficiency. In this talk, we present our recent exciting progress on developing the key device components for the iSLA system: a high performance and flexible thermoelectric device, and a demonstration of in situ probing of energy storage devices.

AGENT-BASED MODELING OF SOLAR POWER ADOPTION BY LOS ANGELES COUNTY RESIDENTS

Presenter: Charles Corbett | UCLA Anderson School of Management

Contributors: Timothy Malloy (Law), Benjamin Nyblade (Law) and Andrea Hicks (Civil & Environmental Engineering, University of Wisconsin, Madison)

3 minute snapshot

This project will develop an agent-based simulation model customized to Los Angeles County to evaluate policies intended to drive adoption of residential photovoltaic systems. Agent-based modeling simulates a population of virtual people having unique attributes, preferences and decision-making rules. We will run hundreds of simulations to understand the likely patterns of technology adoption under various policies. The resulting model will provide the Grand Challenge and policymakers a rigorous means to evaluate likely scenarios flowing from alternative policy options.

AUTOMATED VEHICLES FOR SUSTAINABLE CITIES: FIELD EXPERIMENTS AND FUTURE OUTLOOKS IN LOS ANGELES

Presenter: Chee Wei Wong | Electrical Engineering

Contributors: Rui Wang (Urban Planning)

3 minute snapshot

The transportation sector is essential to economic productivity and quality of life, and accounted for 27-percent of all US greenhouse emissions in 2013. Automated vehicles and associated innovations are rapidly evolving and may soon revolutionize the transportation sector. By reducing accidents and traffic congestion, integrating with electric light-duty vehicles, improving aerodynamics and weight, and platooning, automated vehicles have been rigorously modeled to reduce up to 94-percent of greenhouse gas (GHG) emissions. However, to date, a LA-specific study with field-experiment prototypes has not yet been done. Adoption of the automated vehicle technology has been further hindered by the high cost of the LiDAR (Light Detection and Ranging) laser sensing system. In this project we study an automated vehicle prototype to document its effects on GHG emissions and sustainable transportation, with mileage runs and a low-cost high-performance LiDAR sensor chip. In addition, we study how automated vehicle technology can impact transportation by analyzing first-hand data.

DATA-DRIVEN SUSTAINABLE EV INFRASTRUCTURE FOR LOS ANGELES

Presenter: Omar Asensio | Institute of the Environment & Sustainability

Contributors: Samuel Coogan (Electrical Engineering)

3 minute snapshot

Widespread adoption of electric vehicles (EVs) requires the development of a reliable and efficient charging infrastructure. This collaborative project will establish data-driven models of EV charging behavior that is cognizant of the interplay between peak system loads in the electricity grid and real-time EV charging demand. We will use these models to design experiments and develop theory and algorithms for reducing costs and optimizing the efficiency of EV charging. This project seeks to provide large-scale evidence on EV charging behavior using data from 230 million charge station transaction records via PlugShare, the world's most widely used EV charge station locator app.



NOTES



NOTES





grandchallenges.ucla.edu/sustainable-la



Photo courtesy of Nurit Katz

**Read the 2017 Energy & Air Quality
Report Card for Los Angeles County**

grandchallenges.ucla.edu/sustainable-la/report-card/energy-2017

**Read the Sustainable LA Grand Challenge
Five-Year Work Plan**

escholarship.org/uc/item/7v39j2xt

UCLA Grand Challenges

Sustainable LA