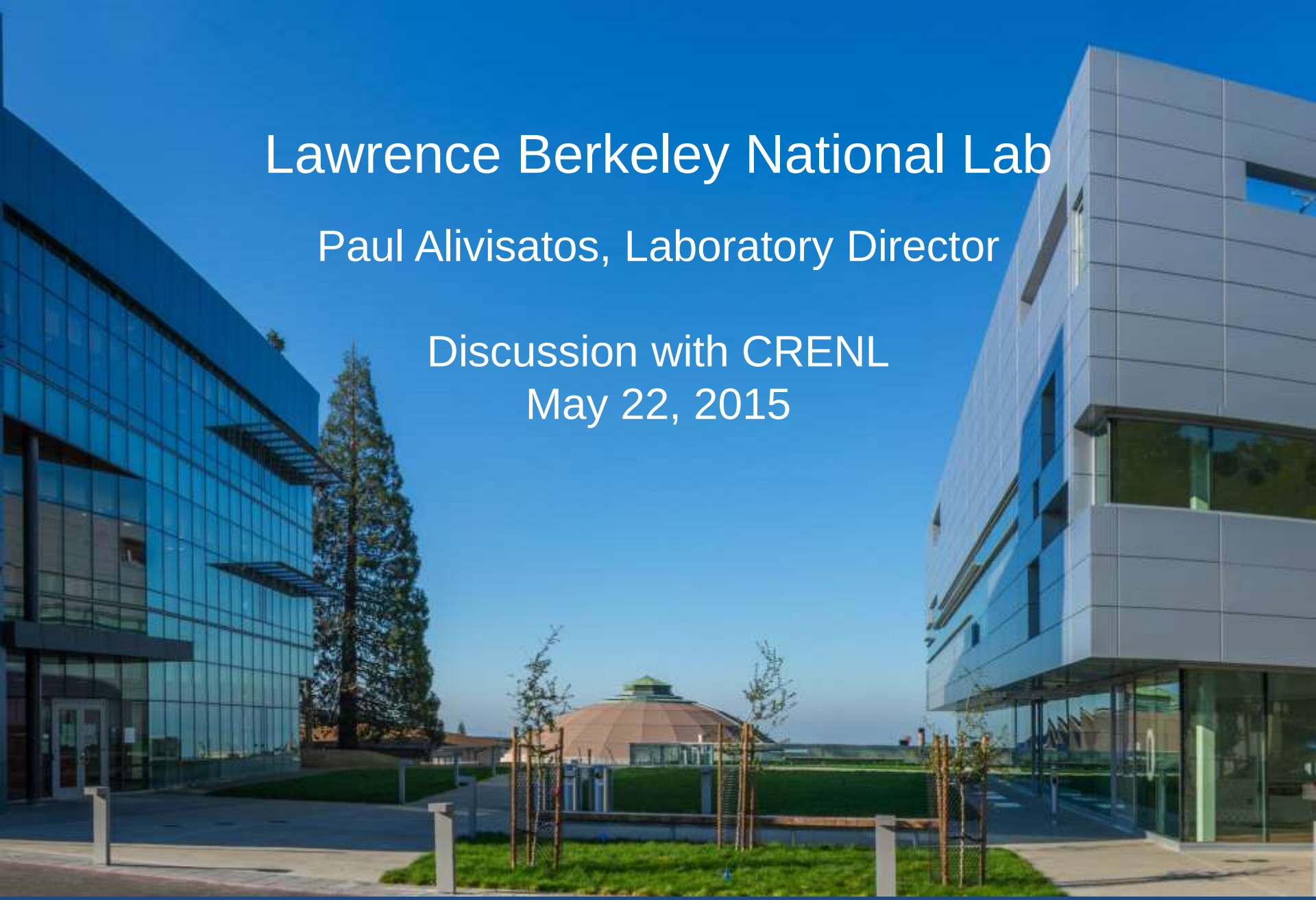


Lawrence Berkeley National Lab

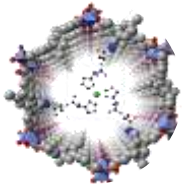
Paul Alivisatos, Laboratory Director

Discussion with CRENL
May 22, 2015

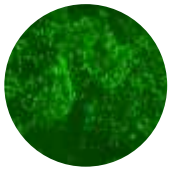
BERKELEY LAB

U.S. DEPARTMENT OF ENERGY | Office of Science

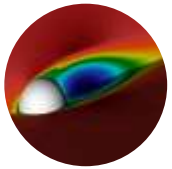
Presentation Overview



Energy Sciences



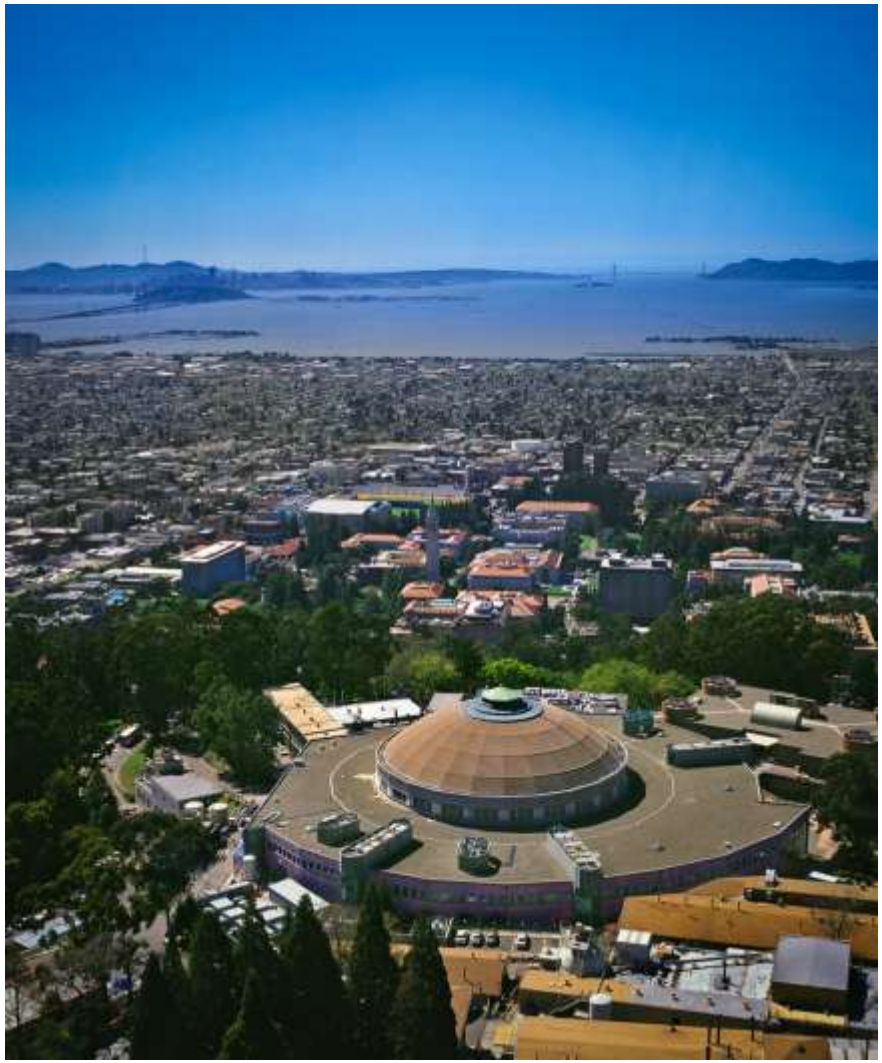
Biology and the Environment



Computing

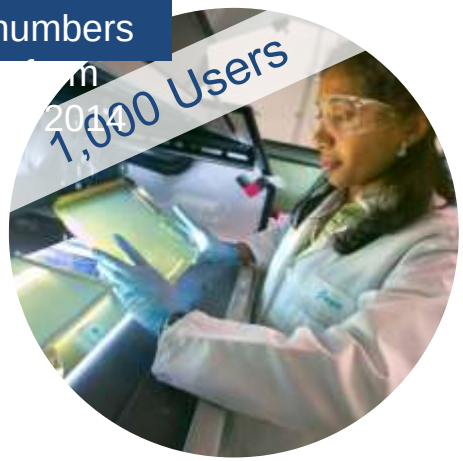
Physical Sciences

Energy Technologies



Berkeley Lab's User Facilities Enable SC Community to Discover, Learn and Create

All numbers [illegible] 2014



The Joint Genome Institute

NERSC

Energy Sciences Network

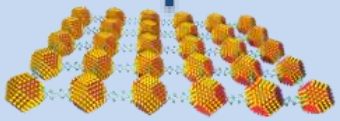
The Advanced Light Source

The Molecular Foundry &

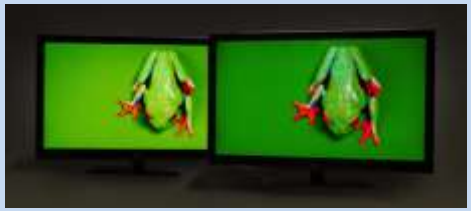
Energy Science Organizing Theme: Controlling the Direction and Flow of Energy with Minimal Losses

CONTROL

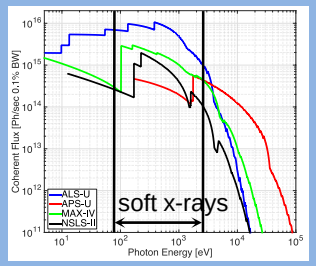
MOLECULAR FOUNDRY



SCIENCE OF NANOSCALE BUILDING BLOCKS

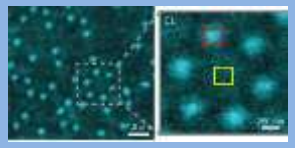


NEW TOOLS



ALS-U

SOFT MATTER ELECTRON



cathodoluminescence activated imaging by resonant energy transfer (CLAIRE)

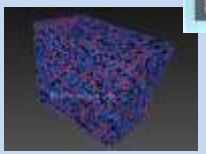
how Li dendrites form

EMERGING SYSTEMS

JCAP JOINT CENTER FOR ARTIFICIAL PHOTOSYNTHESIS

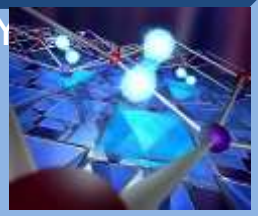
MESOSCALE ENERGY FLOW BETWEEN UNITS

electrolyte discovery & screening



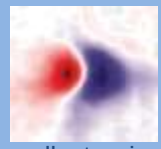
JCESR

FUTURE SY

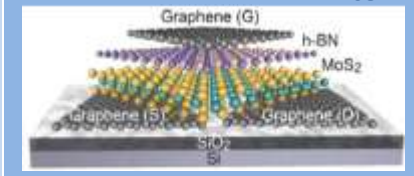


toward room temp superconductors

QUANTUM MATERIALS DISCOVERY



valleytronics



MOLECULAR FOUNDRY

ALS

NERSC

MATERIALS PROJECT

CAMERA

"Microbes to Biomes" is the Organizing Theme for Biological Research at Berkeley Lab

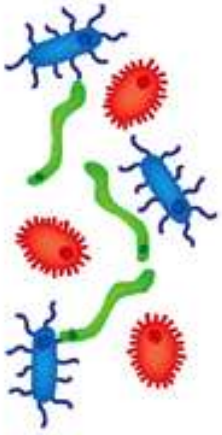
control | **understanding** | **observation** | **early discovery**

jbei
Joint BioEnergy Institute

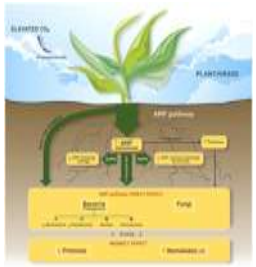
Microbe: the operating unit we can control for energy and environment applications

↓

biomanufacturing



Microbial community: a group of microbes is robust to variations in environment and i… more c…



Microbial communities influence organisms in …itical ways

Microbial communities react to and help define global carbon flux

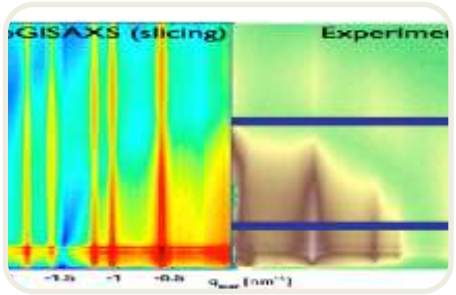
JGI KBase

LBNL is Enabling the Broad Scientific Impact of Exascale

Experimental Facilities

New mathematical analyses

Real-time analysis and data management



Fast implementations on latest computers

Integrated with ESnet: Designed for Big Science Data

Computing Facilities

Physics & Cosmology

Cosmology

Cosmic Microwave Background Anisotropy *(Smoot)*; Discovery of Dark Energy *(Perlmutter)*

- LZ: Most sensitive dark matter experiment in next decade
- DESI: Most powerful experiment in the coming decade for dark energy

Nuclear Science

Quantum many-body systems from nuclei to supernovae &neutron stars:

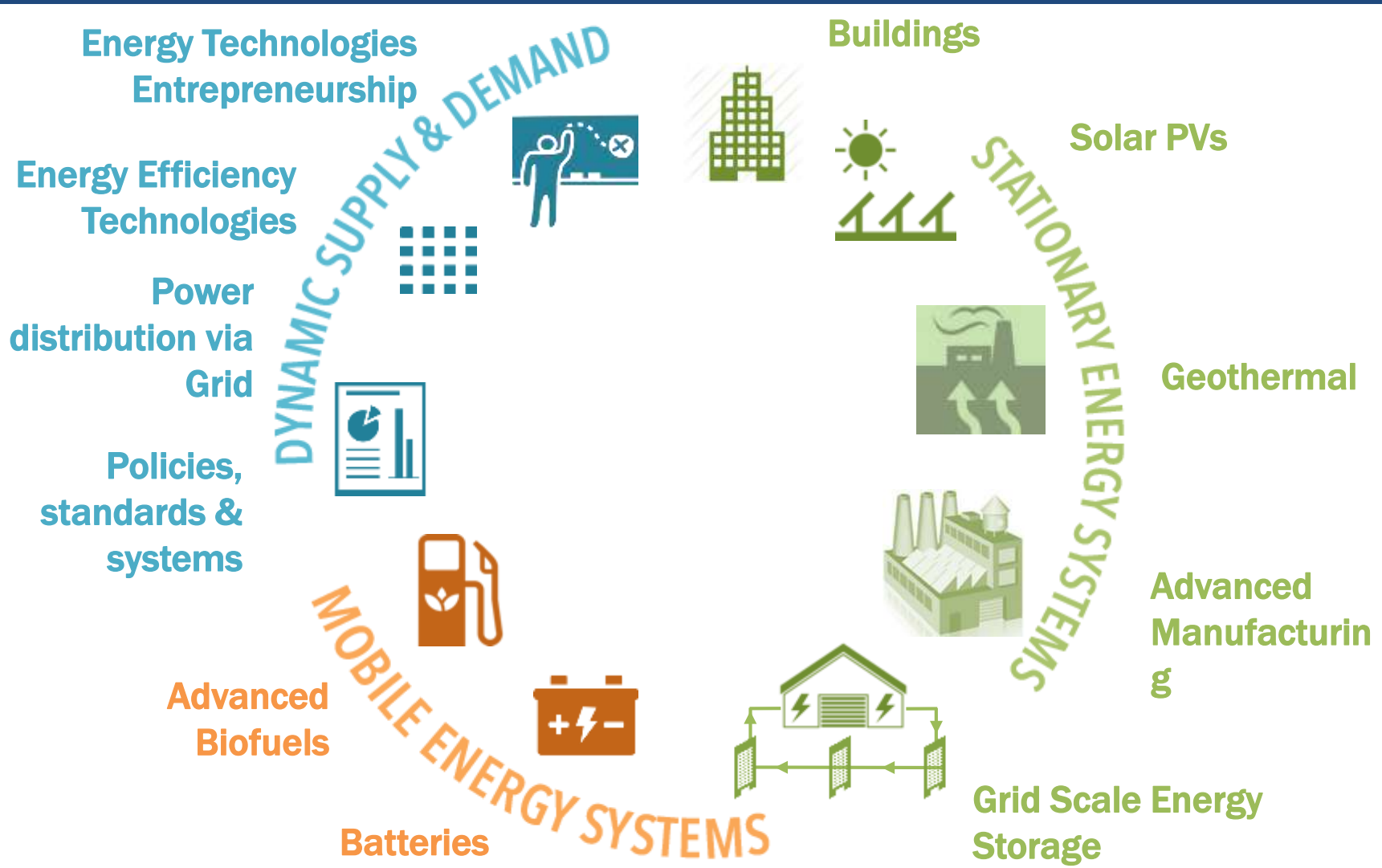
- origin of elements and interactions within

GRETINA

Novel Accelerators

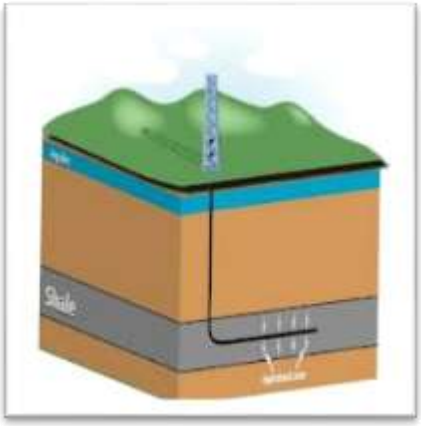
The science of accelerators & accelerators for science

Energy Technologies for a Future Energy System



Examples of LBNL in National Lab Networks: Energy

The Shale Gas Revolution



Sandia, LBNL, LLNL, Los Alamos, NETL
Thanks to DOE investment and national lab efforts, shales now produce over 25% of domestic natural gas resources, up from 2% in 2001

Energy Efficiency Technologies

LBNL, NREL, Oak Ridge, PNNL, Sandia
Since the '70s, the labs have been reducing energy consumption, producing CFLs, Energy Star standards, cool-roofing materials, and Aeroseal duct sealer

Renewable Energy Technologies

NREL, ANL, LBNL, ORNL, Sandia, SLAC
Basic PV and wind energy materials and manufacturing; DOE Test Sites; energy and policy analysis for renewable energy