A photograph of a modern, multi-story building with a glass and metal facade, likely a laboratory or office building at Lawrence Berkeley National Lab. The building is set against a clear blue sky. In the foreground, there is a paved walkway and some greenery, including a large tree and a smaller structure with a dome roof. The overall scene is bright and clear.

Lawrence Berkeley National Lab

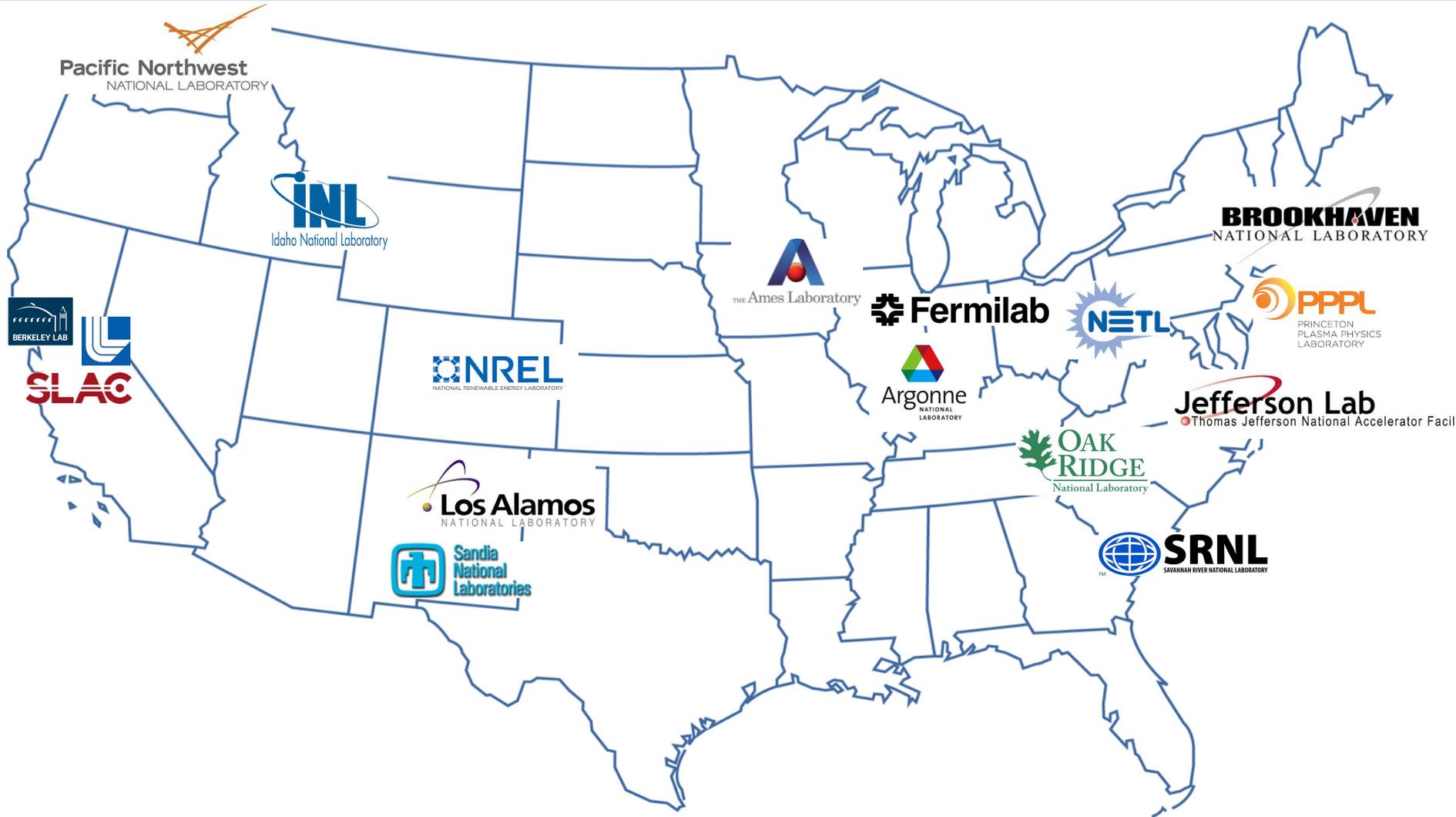
Presentation to the:

**Secretary of Energy Advisory Board**

Paul Alivisatos, Laboratory Director

January 26, 2016

# DOE Accomplishes its Mission through its National Lab Network



# LBNL is an integral part of the DOE-SC National Lab Network. We are the most open, sharing and connected.

UNIVERSITY  
OF  
CALIFORNIA



Most productive  
integration with a  
major research  
university

253

JOINT  
FACULTY

500

POST  
DOCS

318

GRAD  
STUDENTS

132

UNDERGRAD  
STUDENTS

Berkeley Lab hosts 10,000 users per year –  
1/3 of DOE total



NERSC  
5,608 users



The Advanced  
Light Source  
2,443 users



The Joint Genome  
Institute  
1,000 users



Energy Sciences Network  
240 Petabytes/yr.



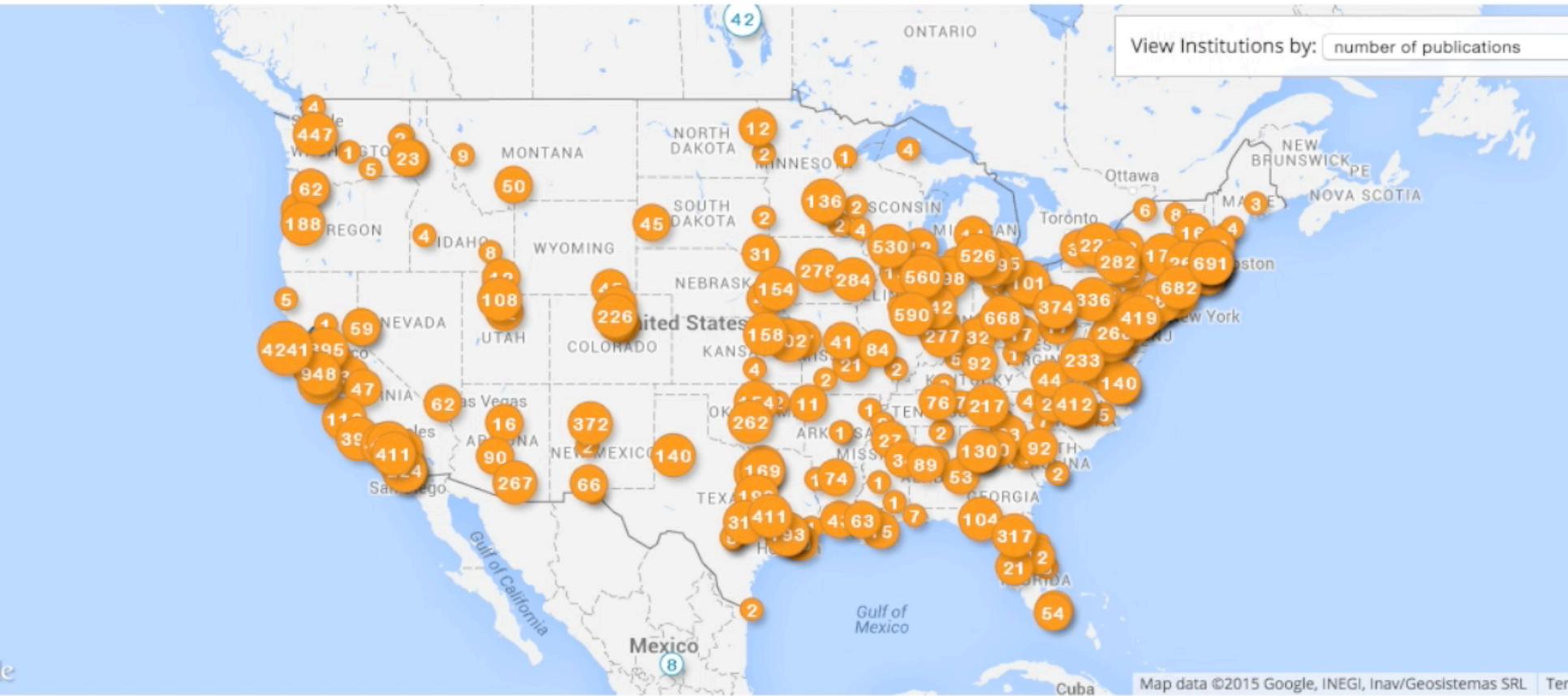
The Molecular Foundry  
616 users

# Berkeley Lab's Public-Spirited Approach: Open, Sharing, Connected, Networked

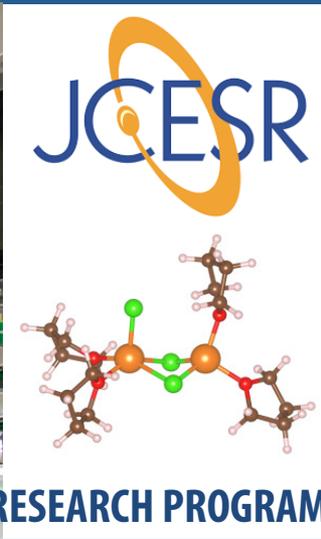
Institutions collaborating with Lawrence Berkeley National Laboratory

United States Academic reset filter

9,194 co-authored publications



# A model for how a national lab can connect DOE's basic and applied programs to society



RESEARCH PROGRAMS



SCIENTIFIC FACILITIES



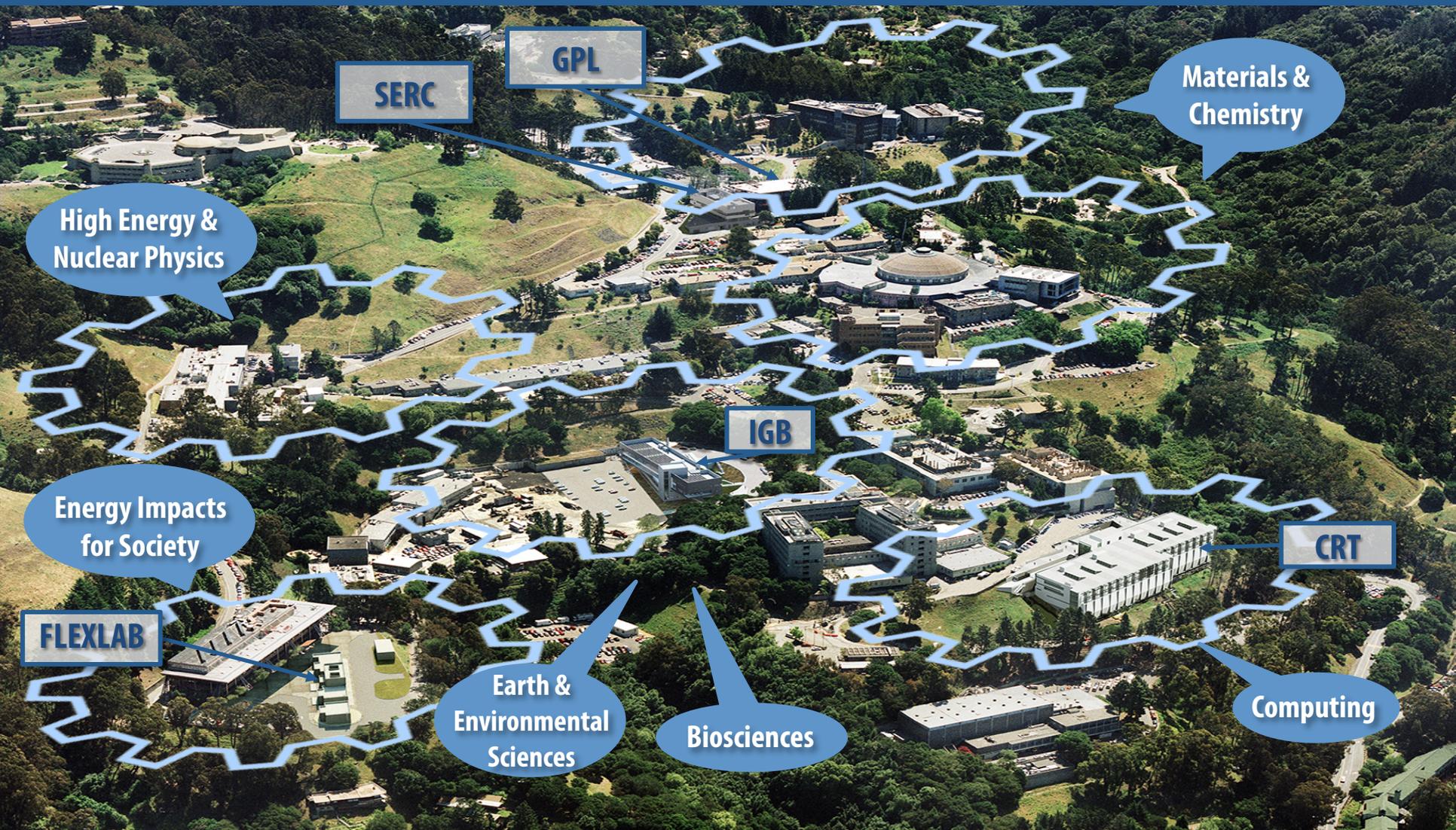
BAY AREA ENTREPRENURIAL COMMUNITY



cyclotronroad

Berkeley Lab is pioneering creative ways to break down silos and move technology to the marketplace

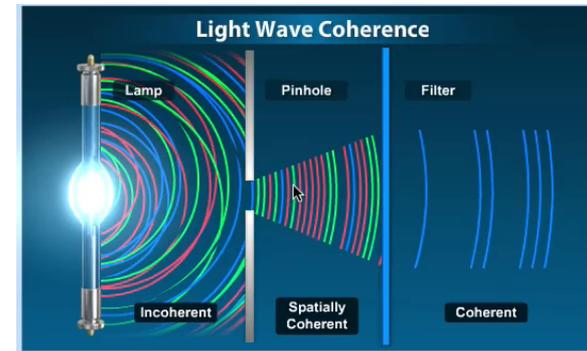
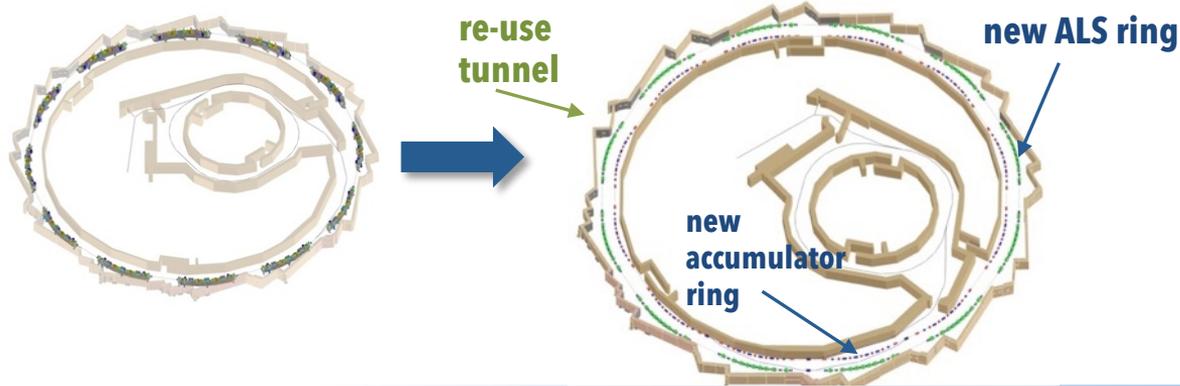
# Interlocking & Re-enforcing Facilities & Programs



# Coherence will revolutionize the Light Source Network: ALS-U and (Soft) X-Ray Science

ALS 2015: World class  
soft x-ray science

ALS-U 2020s: A new era  
of SXR leadership



Diffraction Limit and Spatial  
Coherence Enabled by ALS-U

## DESIGNING THE WORLD'S BEST SOFT X-RAY SYNCHROTRON

- New multi-bend achromat lattice
- Cost effective upgrade
- Fully coherent beam
- Opportunities: novel undulators

## NEW SOFT X-RAY SCIENCE

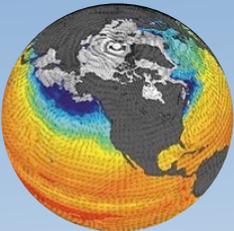
- Chemical, electronic and functional mapping with  $\sim$ nm resolution in four dimensions
- Dramatic expansion of accessible time scales, from picoseconds to minutes
- Interferometry in the X-ray regime

# A Plan for Berkeley Lab to Effectively Contribute Over the Coming Decades



## Biocampus

The world's leading center for study of how biology and the environment interact



## Exascale Computing

Thousandfold expansion of computing capability will transform fields of science



## Advanced Light Source Upgrade

The world's leading soft X-ray light source will provide qualitatively new ways of seeing in the energy world

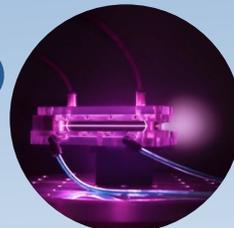
## Cosmology @ Berkeley

Experiments in Dark Energy and Dark Matter, and a Cosmic Frontier Data Facility help to understand the Universe



## Future Accelerators

Berkeley Lab leads in creating ultra compact accelerators and advanced magnets



## Berkeley Lab as Catalyst

for energy innovation ecosystem, market translation for entrepreneurial energy technologies



An aerial night photograph of the Berkeley Lab campus and the surrounding city of Berkeley, California. The scene is illuminated by the warm glow of city lights and streetlights, contrasting with the deep blue twilight sky. In the foreground, several large, modern buildings with flat roofs and a prominent circular building with a dome are visible. A parking lot with several cars is situated in the middle ground. The background shows the city's lights extending to the waterfront, with the San Francisco Bay and distant hills visible under a clear night sky.

# Thank You