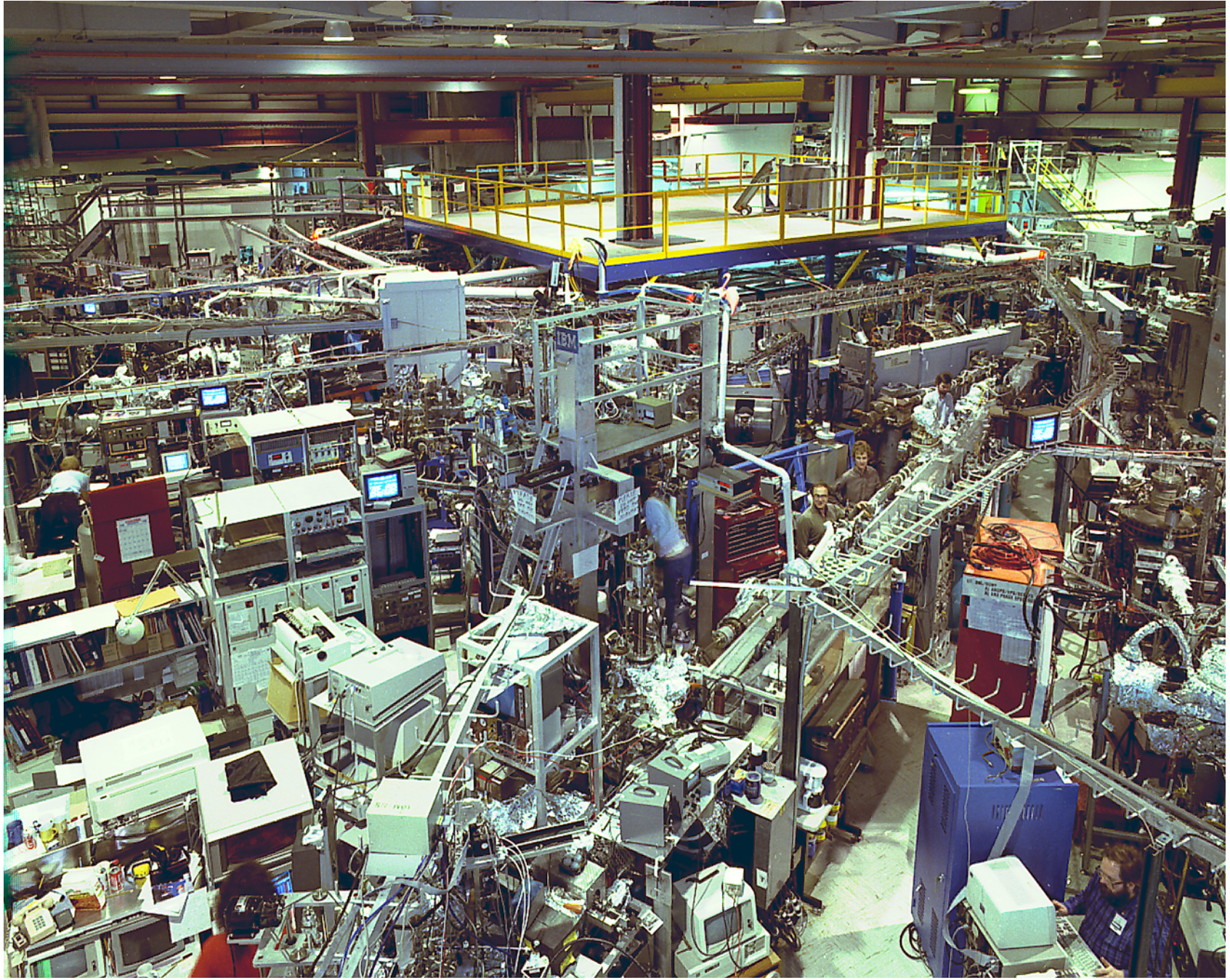
Building a Digital Archive of the National Synchrotron Light Source (NSLS)

Jean Elyse Graham

Robert P. Crease

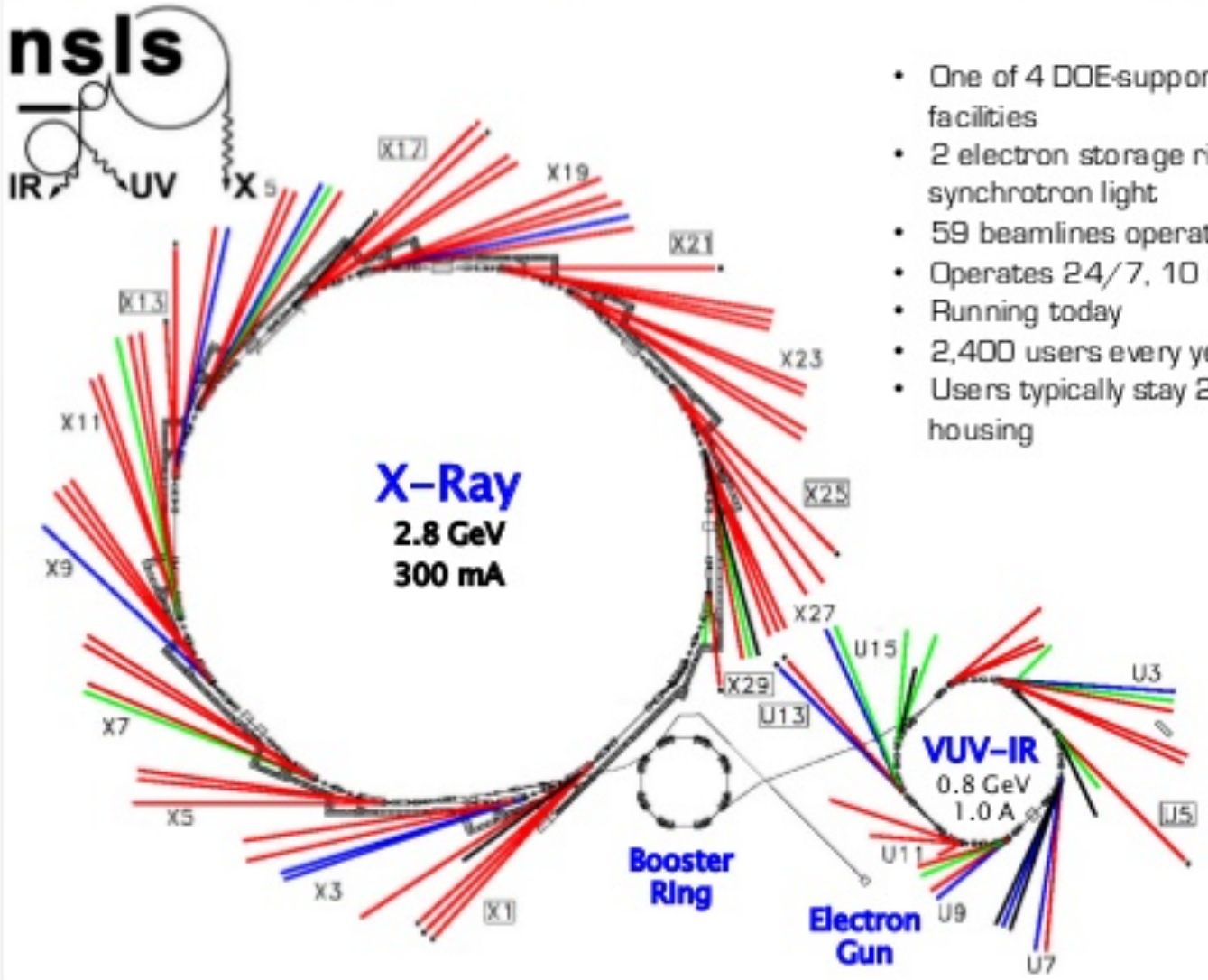
Stony Brook University

Courtesy Brookhaven National Laboratory

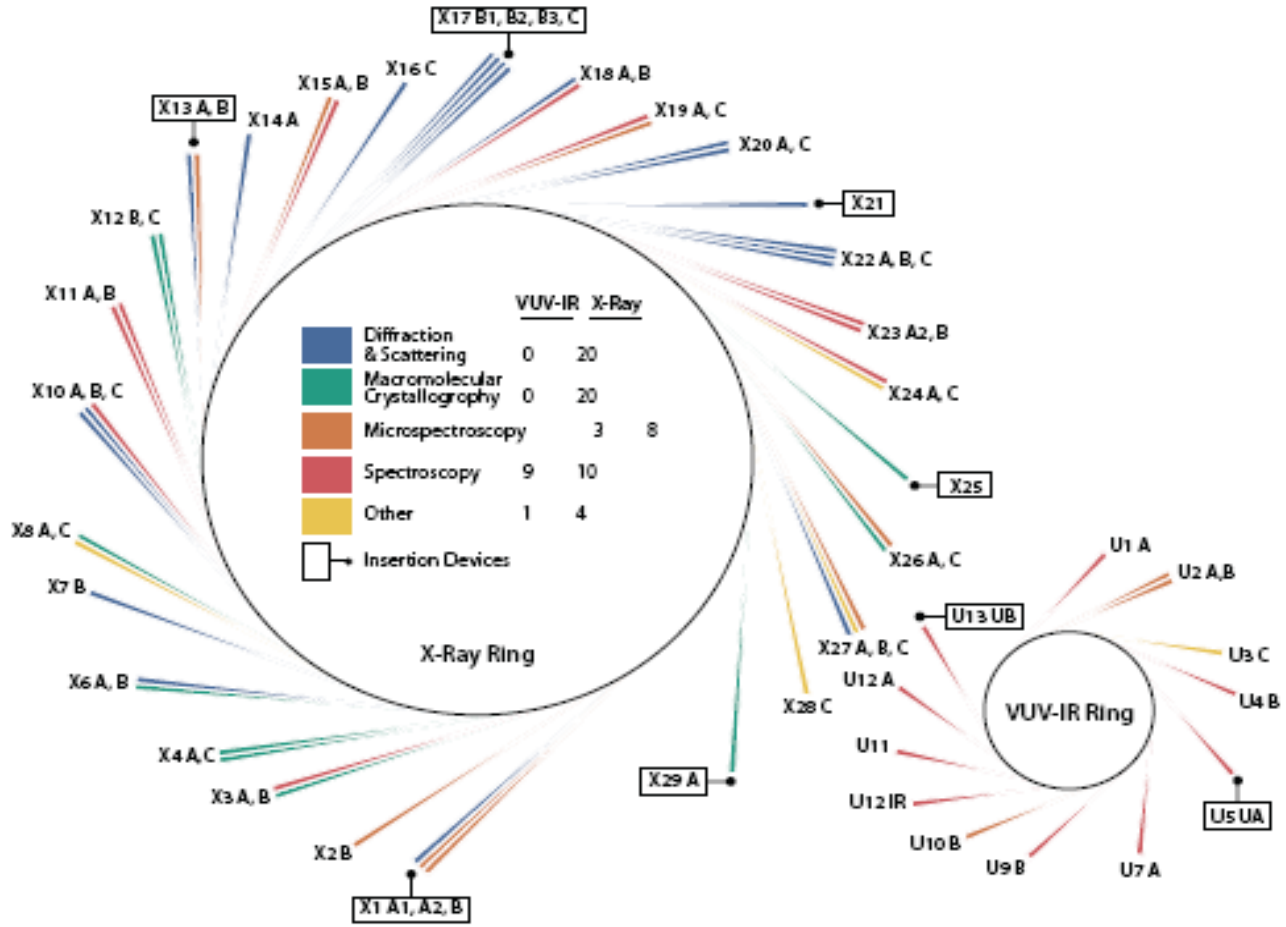


Courtesy Brookhaven National Laboratory

From NSLS...



- One of 4 DOE-supported synchrotron facilities
- 2 electron storage rings that produce synchrotron light
- 59 beamlines operate simultaneously
- Operates 24/7, 10 months per year
- Running today
- 2,400 users every year
- Users typically stay 2-4 days in on-site housing



Courtesy Brookhaven National Laboratory

Biomineral Imaging

Courtesy Brookhaven National Laboratory

NSLS Users

Users' field of research breakdown:

- life sciences: 42 percent
- materials science: 29 percent
- geosciences and ecology: 13 percent
- chemical sciences: 5 percent
- optical/nuclear/general physics: 5 percent
- applied sciences and engineering: 3 percent
- unknown: 3 percent

Geographical user distribution:

- New York only: 33 percent
- Northeast (not New York): 33 percent
- Non-northeast: 20 percent
- Foreign: 14 percent

Users by affiliation:

- academic: 72 percent
- BNL employees: 10 percent
- industry/corporate: 7 percent
- other labs and affiliations: 6 percent
- DOE employees (non-BNL): 2 percent
- Federal agencies (non-DOE): 2 percent

Beamtime used by field of research:

- materials science: 39 percent
- life sciences: 22 percent
- environmental and geosciences: 11 percent
- applied sciences and engineering: 10 percent
- other: 6 percent
- optical/nuclear/general physics: 5 percent
- chemical sciences: 4 percent

Courtesy Brookhaven National Laboratory

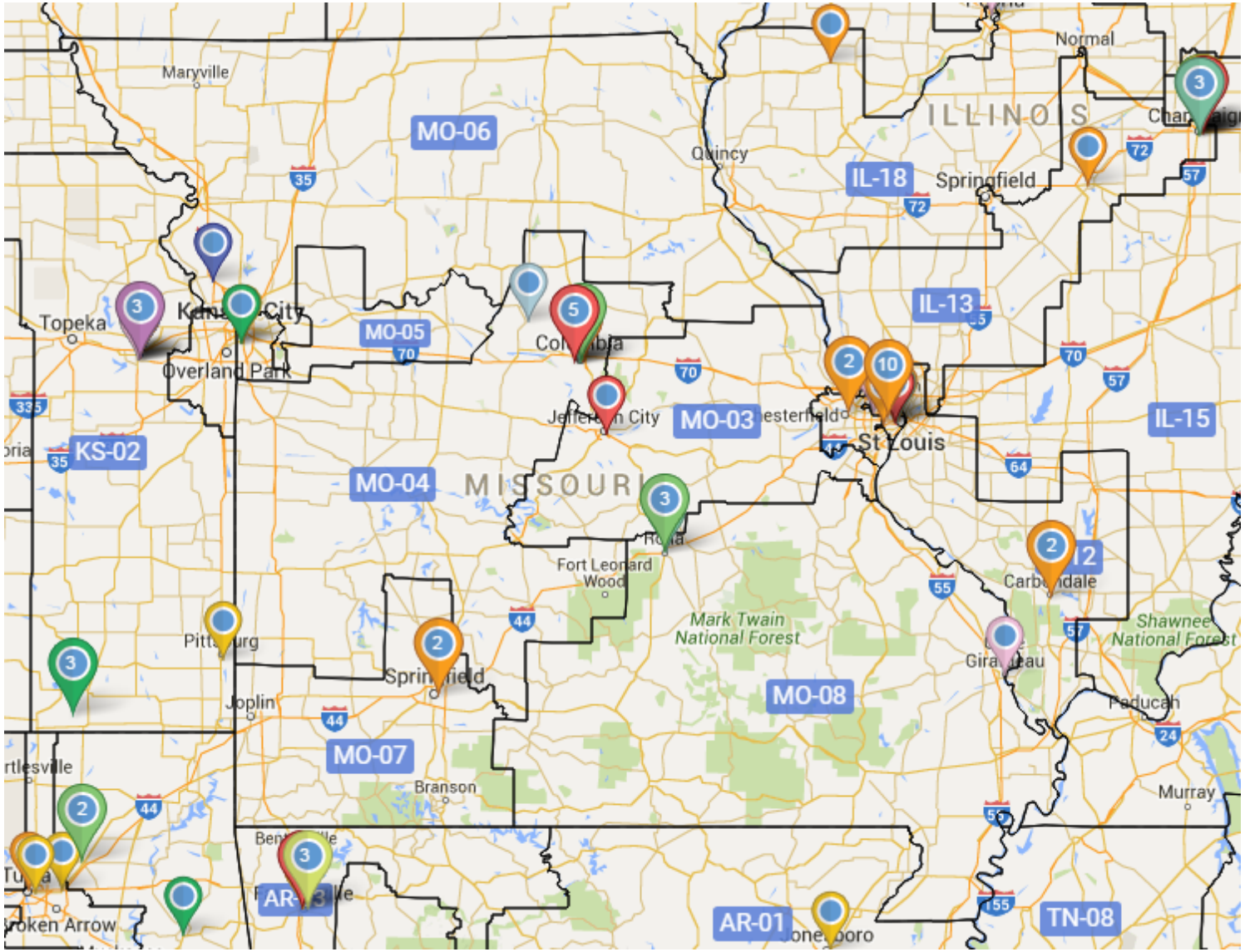
Distinctive Features of New Big Science Research

1. Integration of industrial presence from beginning
2. Scope and complexity of interdisciplinary networks
3. Proliferation of subfacilities
4. Formation of knowledge
5. Research Culture

Investigating the Research Ecosystem

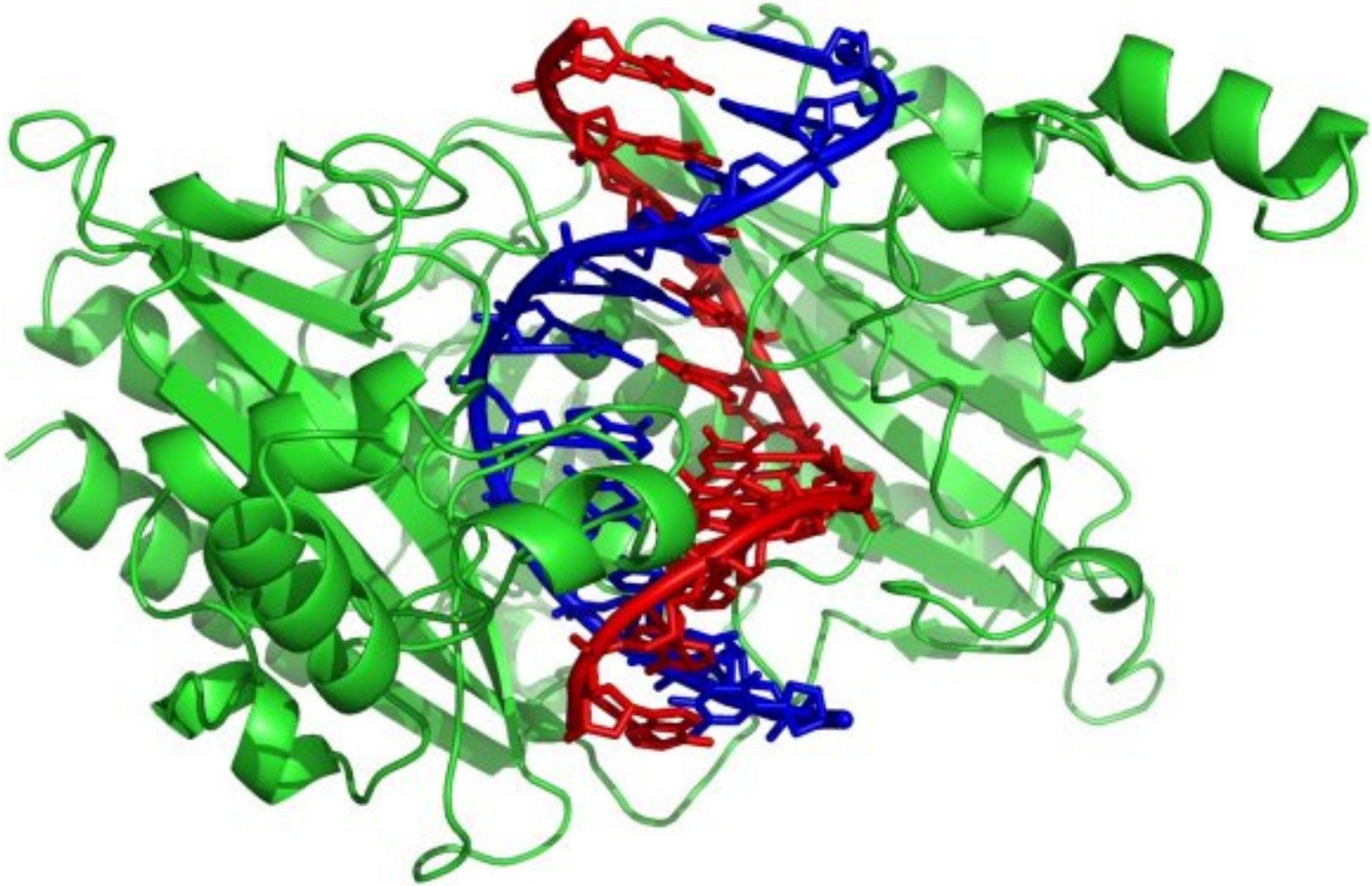
- Operational history
- Administrative History
- Functional History
- Publication History
- Discovery History
- Disciplinary History

science.energy.gov/user-facilities/user-statistics/



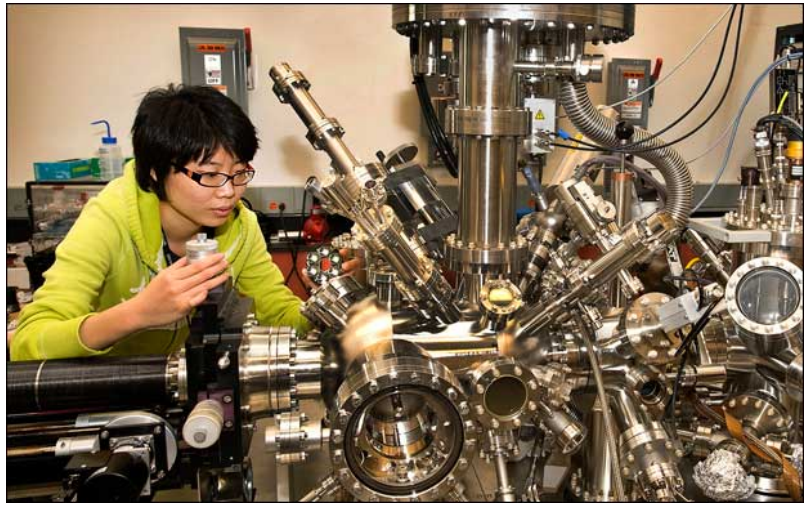
Credit:

DOE Office of Science visualization using Maptive, powered by Google Maps APIs.



New Big Science Research Features

1. Integration of Industrial Presence from the Beginning



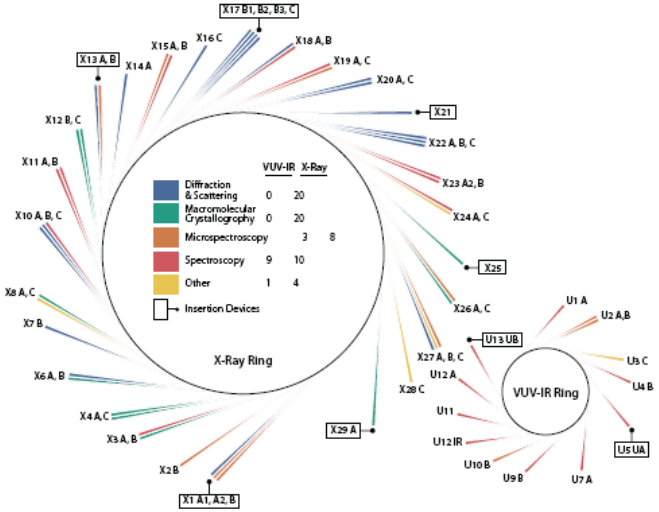
Courtesy Brookhaven National

New Big Science Research Features

1. Integration of industrial presence from beginning
2. Scope and complexity of interdisciplinary networks

New Big Science Research Features

1. Integration of industrial presence from beginning
2. Scope and complexity of interdisciplinary networks
3. The octopoidal character of research networks



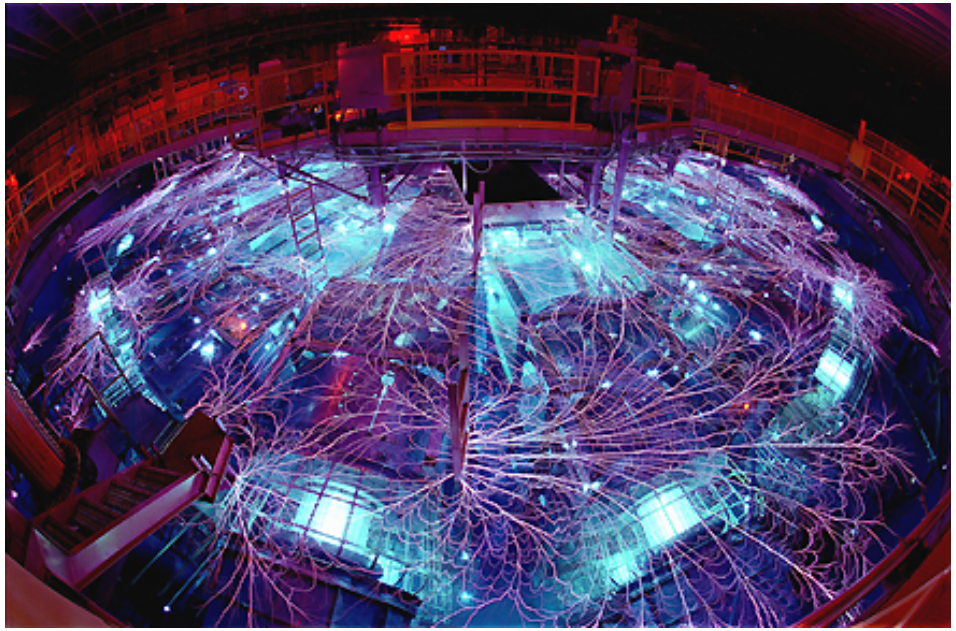
Courtesy Brookhaven National Laboratory

New Big Science Research Features

1. Integration of industrial presence from beginning
2. Scope and complexity of interdisciplinary networks
3. The octopoidal character of research networks
4. Multistability of techniques

New Big Science Research Features

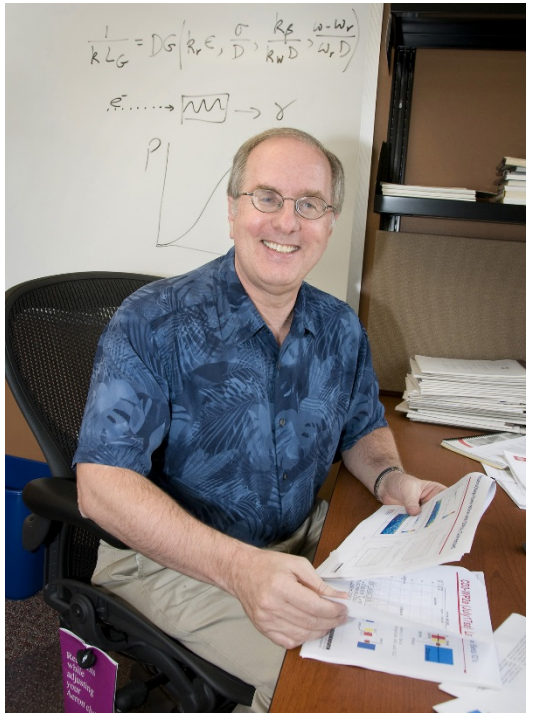
1. Integration of industrial presence from beginning
2. Scope and complexity of interdisciplinary networks
3. The octopoidal character of research networks
4. Multistability of techniques
5. Proliferation of subfacilities



Courtesy Sandia National Laboratory

New Big Science Research Features

1. Integration of industrial presence from beginning
2. Scope and complexity of interdisciplinary networks
3. The octopoidal character of research networks
4. Multistability of techniques
5. Proliferation of subfacilities
6. Krinsky Effect

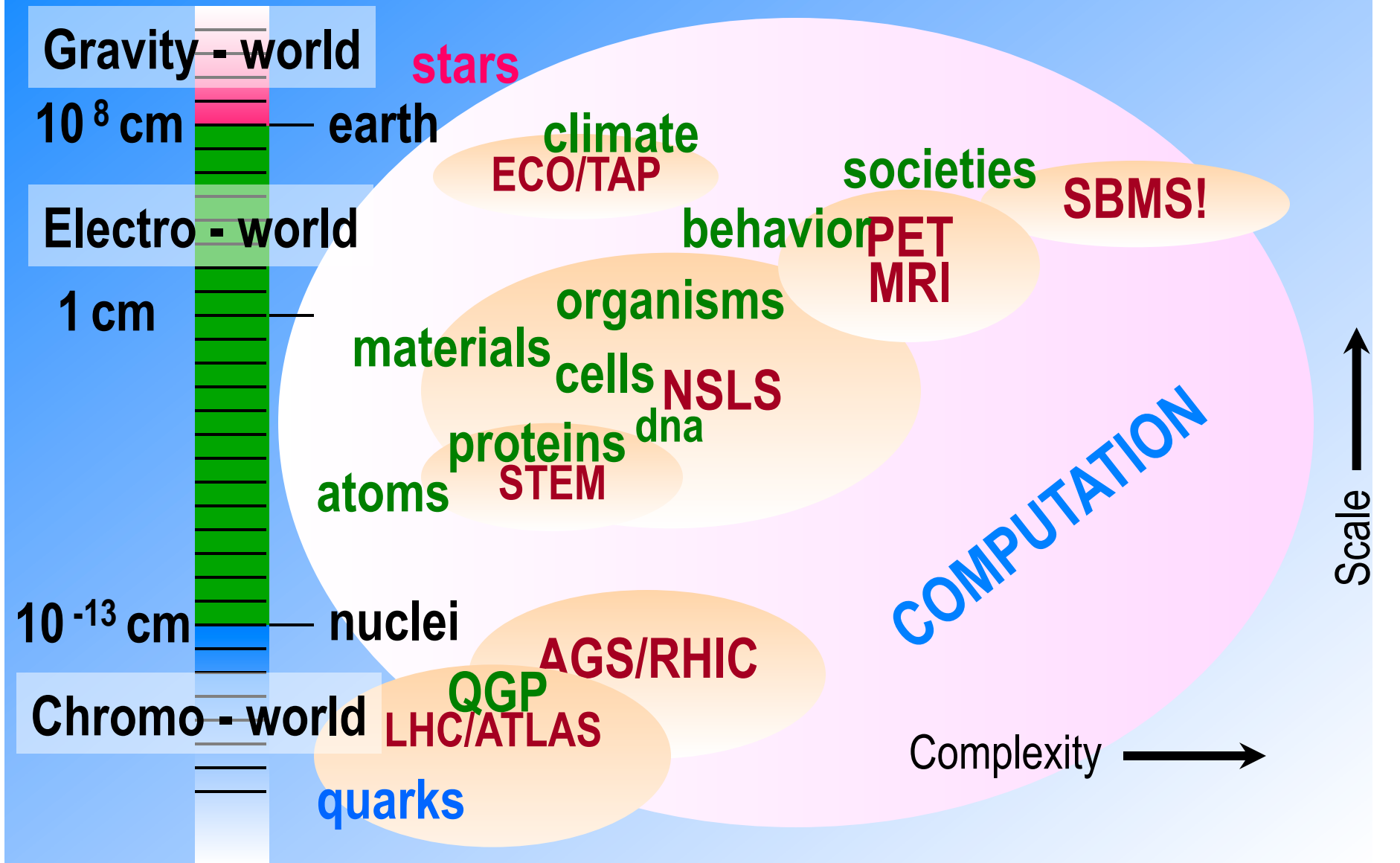


Courtesy Brookhaven National Laboratory

New Big Science Research Features

1. Integration of industrial presence from beginning
2. Scope and complexity of interdisciplinary networks
3. The octopoidal character of research networks
4. Multistability of techniques
5. Proliferation of subfacilities
6. Krinsky Effect
7. Regulation
8. Formation of Knowledge

BNL facilities within the structure of science



Courtesy Brookhaven National Laboratory

Challenges of the New Big Science

For Managers/Researchers

- Intellectual Property
- Timely Access
- Presenting the Political Case
- Presenting the Scientific Case

Challenges of the New Big Science

For Historians

- What research was carried out at each port, with what instruments, associated with what work at other ports?
- How long did each research program last?
- How was it funded?
- With what industrial/academic/other collaborators?
- With what applications?
- Associated prizes, grants, publications, patents, educational programs (high school and summer school programs, undergraduate and graduate theses served, Westinghouse awards), etc.

Building a Digital Archive of the National Synchrotron Light Source (NSLS)

Jean Elyse Graham

Robert P. Crease

Stony Brook University