27 APRIL 2022

eBERlight – a Virtual CAT for the Biological and Environmental Research Community

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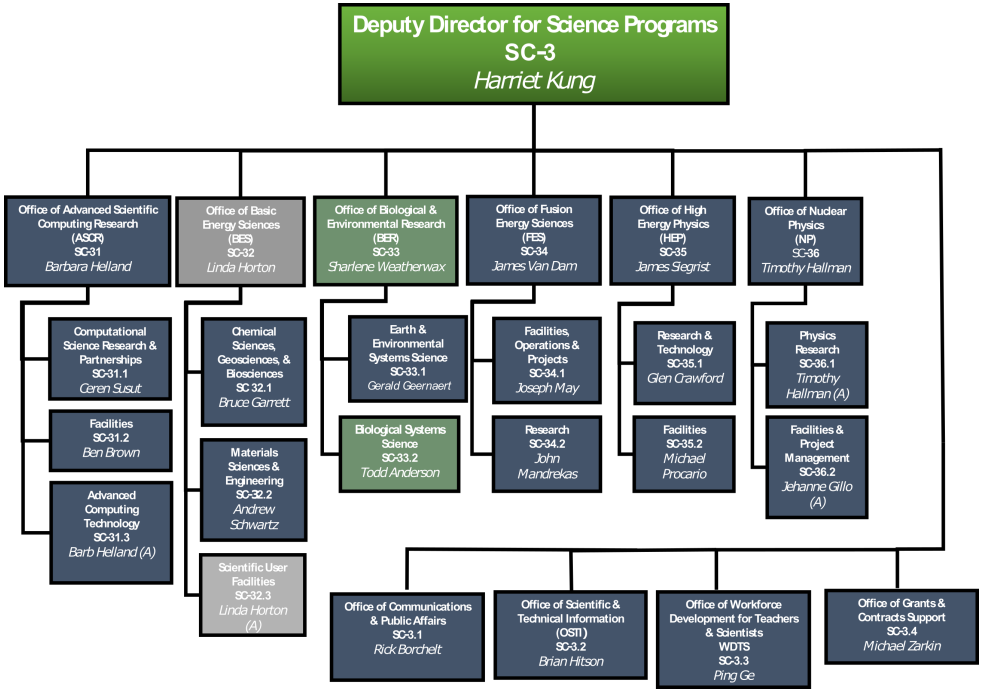
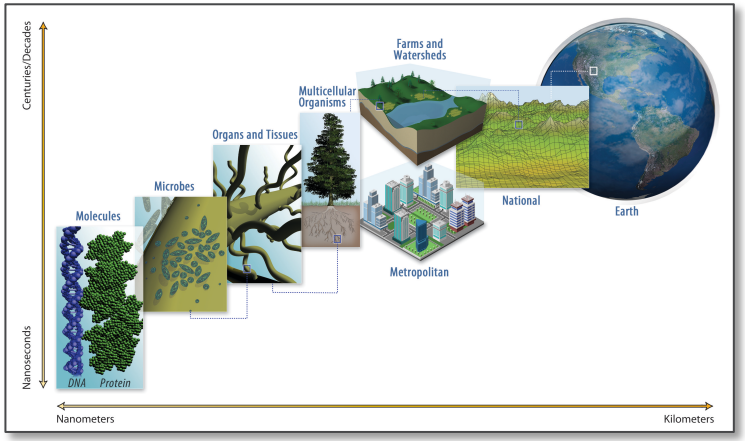
STRUCTURAL BIOLOGY CENTER TRANSITIONING TO eBERlight

Current status	• SBC is funded by DOE Biological and Environmental Research • Operates 2 MX beamlines (19-ID, 19-BM) for the general user community
Need for change	• BER community needs access to other techniques • APS-U brings new opportunities • 19-ID will host In Situ Nanoprobe
Future program	• eBERlight will serve as a liaison between BER researchers and the APS • Leverage additional ANL resources • Integrate with other DOE/BER facilities

DOE BIOLOGICAL AND ENVIRONMENTAL RESEARCH



"Biological and Environmental Research (BER) program supports transformative science and scientific user facilities to achieve a predictive understanding of complex biological, earth, and environmental systems for energy and infrastructure security, independence, and prosperity."

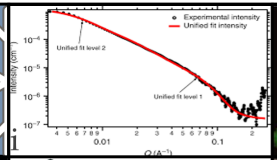
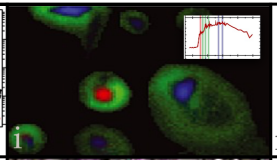
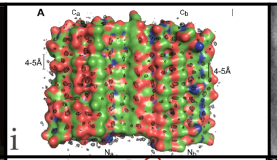
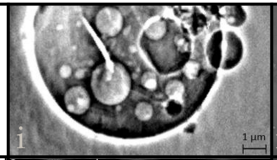
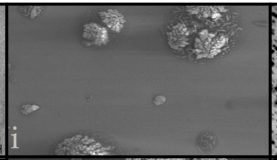
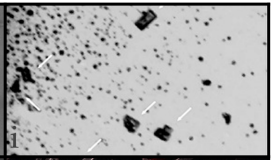
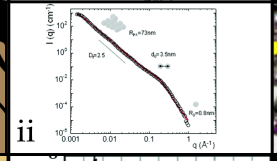
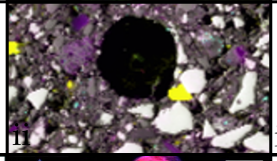
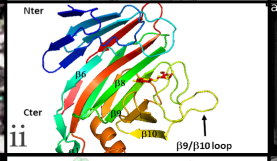
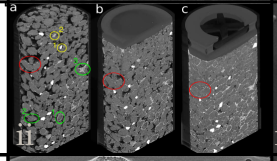
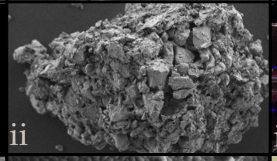
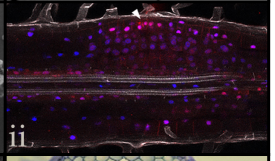
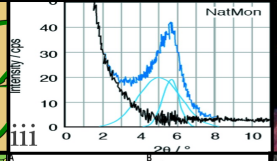
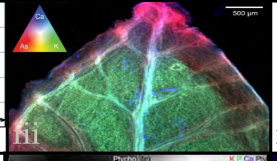
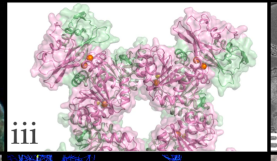
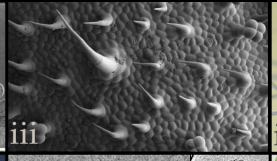
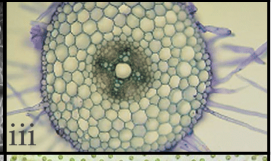
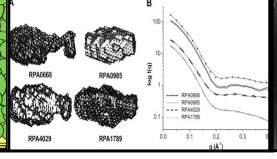
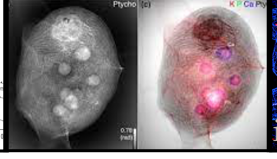
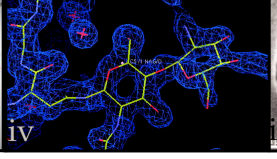
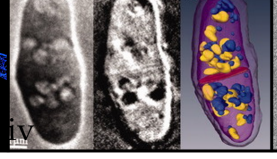
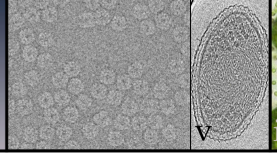
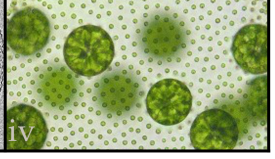


Grand Challenges for Biological and Environmental Research: Progress and Future Vision, 2017

MULTIMODAL APPROACH TO BER SCIENCE AT APS-U

APS-U Techniques

Complementary

	Solution SAXS	*Point Probe XFM / XAS*	*Crystallographic MX*	*Full-field Imaging XMIC*	*Electron Microscopy EM*	*Non-Destructive Optical MIC*
Atmosphere						
Roots Soils						
Plant physiology						
Microorganisms Cellular Biology						
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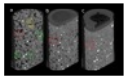
eBERlight CAPABILITIES FOR BIOLOGICAL & ENVIRONMENTAL SCIENCE

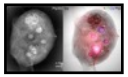
Crystallography
21-ID (LS-CAT)

Full-field imaging

2-BM
32-ID



X-ray microscopy
2-ID-D
2-ID-E
(ISN,
25-ID-D,E)



Molecular biology

Advanced Protein Characterization Facility

Sample preparation

Cryolab at APS
Lab infrastructure in bld. 203

Microfluidics

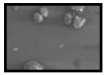
Advanced Protein Characterization Facility

Computing

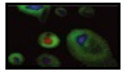
Argonne Leadership Computing Facility

Electron microscopy

Center for Nanoscale Materials
Picoprobe

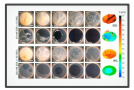


X-ray absorption spectroscopy
9-BM
20-BM
25-ID-D,E
10-ID, BM



Small-angle X-ray scattering

9-ID
12-ID
12-BM



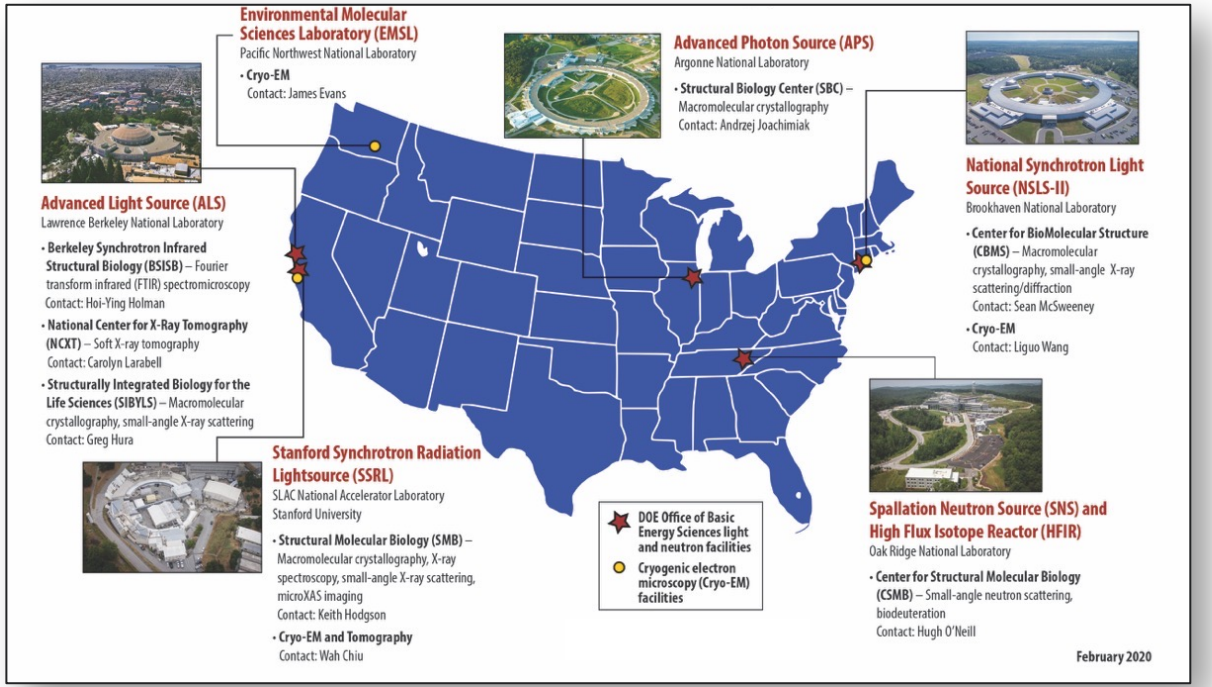
eBERlight INTEGRATION WITH OTHER DOE/BER RESOURCES

EMSL

ARM

JGI

KBase
PREDICTIVE BIOLOGY



berstructuralbioportal.org

eBERlight ORGANIZATION

Comprehensive program for BER community starting FY24

Virtual Collaborative Access Team (CAT) managed by X-ray Science Division

Guaranteed beamtime across several beamlines (max. 2 beamlines equivalent)

Effort distribution:

- 25% crystallography (LS-CAT)
- 65% microscopy & imaging (XSD)
- 10% X-ray absorption spectroscopy & SAXS (XSD)

50% of the eBERlight guaranteed beamtime to support CAT members (BER researchers), 50% to support General User Program

ACKNOWLEDGEMENTS

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Barry Lai
Jonathan Lang
Alex Lavens
Krzysztof Lazarski
Byeongdu Lee
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